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WEED ABSTRACTS

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NOTES FOR READERS

Weed Abstracts endeavours to provide a comprehensive coverage of the world's literature on weeds, weed control and closely allied subjects. To this end, over 370 journals and nearly 100 annual reports are regularly searched. Other journals, reports, bulletins, etc. are abstracted as they are seen. Additional coverage is obtained through agreements with other abstracting organisations.

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As far as possible the journal abbreviations used are those given in the World List of Scientific Periodicals. Holding libraries in Oxford and elsewhere are also taken from the World List, e.g. O.BO = Botany Department, Oxford. Numbers at the end of abstracts, e.g. 75(492) are for internal use only.

When a paper is by more than one author, the address of the first author only is given.

Where an abstract is taken from an abstracting journal the acknowledgement follows the abstract, e.g. Herb.Abstr., 2,163. Where it is quoted only in part the acknowledgement is preceded by the word "from", e.g. From Biol.Abstr., 2,294.

The Information Section is always pleased to receive comments and suggestions for the improvement of Weed Abstracts.

* An asterisk before the author's name indicates that only the title of the paper has been seen.

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ac	- acre(s)	in.	- inch(es)	p.s.i.	- pounds per square in.
a.e.	- acid equivalent	kg	- kilogram(s)	v/v	- volume/volume
a.i.	- active ingredient	l	- litre(s)	w/v	- weight/volume
cm	- centimetre(s)	lb	- pound(s)	w/w	- weight/weight
d.b.h.	- diameter at breast height	m	- metre(s)	>	- greater than
		ml	- millilitre(s)	<	- less than
ft	- foot(feet)	oz	- ounce(s)	#	- pounds per acre
g	- gram(s)	post-em.	- post-emergence	±	- with or without
gal	- gallon(s)	pre-em.	- pre-emergence		
ha	- hectare(s)	p.p.m.	- parts per million		

Language abbreviations: an initial capital denotes the language of the article, a small letter that of the summary: - Dan. - Danish, Du. - Dutch, E. - English, F. - French, G. - German, It. - Italian, Jap. - Japanese, Nor. - Norwegian, Russ. - Russian, Span. - Spanish, Sw. - Swedish.

817. GREAT BRITAIN, ROTHAMSTED EXPERIMENTAL STATION. Rep.Rothamsted Exptl Sta. 1960, 1961.

1. Wild oats, pp.102-3. In the 5th and last year of an experiment on plots ploughed in the Autumn of 1959 after 5 years under ley, there were 7 Avena fatua seedlings per 10 yd^2, compared with 6 in 1959 and 90 before the ley was established, indicating that the residual population of viable A. fatua seeds is still far from exhausted. In an experiment in a field in Northamptonshire which had a mixed infestation of A. fatua and A. ludoviciana there were still > 2 million viable wild oat seeds/ac after 6.5 years under a ley. Plants of 84 European, 10 Australian and 8 British strains were grown in pots. European A. fatua and A. ludoviciana strains behaved as did the British strains, except that their panicles emerged a few days earlier. Australian strains of these species differed from both European and British strains in that their panicles emerged about 3 weeks earlier, were shorter, had fewer seeds/panicle and bore nearly twice as many panicles/plant. More than 90% of the seed of most of the selections of plants of A. fatua, A. ludoviciana and A. barbata grown in the glasshouse were dormant when sown in October. Seeds of type fM of A. fatua, the first seeds of spikelets of A. ludoviciana and seeds of A. barbata from France and Australia (but not those from Malta) were all non-dormant.

2. Survival of arable weed seeds in the Geescroft wilderness, p.104. Natural woodland has grown undisturbed on this site since 1867. Samples of soil from the formerly ploughed soil levels (not from the leaf litter or surface humus levels) still contained viable seeds of Rumex obtusifolius, Anagallis arvensis and Vicia hirsuta.

3. Competition between crop and weeds, pp.104-5. In 2 wheat fields only Atriplex patula and Polygonum aviculare significantly affected wheat yields. Within a range of 10-3000 seedlings/yd^2, a 10-fold increase in density decreased wheat yields by 10% for A. patula and by 6% for P. aviculare. 100 mature plants/yd^2 decreased wheat yields by 20% for A. patula and by 12% for P. aviculare.

4. Survey of competitive effects of common weed species, p.105. In trials in which 16 seedlings of 7 weed species were established in pots together with a single plant of kale or wheat, Sinapis arvensis had markedly adverse effects on crop growth and decreased the dry weight of kale by 95% and that of wheat by 80%, though this effect may have been partly due to the relatively early germination of the weed seed, compared with that of the crop. Polygonum convolvulus followed S. arvensis in effect on the crops; Alopecurus myosuroides had a slightly less adverse effect than P. convolvulus. Chenopodium album was the only species whose adverse effect on the crops increased as the soil nitrogen level increased.

5. Competitive effects of Agropyron repens, pp.105-6. In studies in which A. repens was grown with radishes as a test crop, its competitive effect could be attributed to its effect on nitrogen uptake and not to any effect on phosphorus supply. The production of phytotoxic substances during the decay of A. repens rhizomes under anaerobic conditions was rapid within the first 12 days, but thereafter small. Anaerobic preparations reduced the growth of radicles of rape seedlings by 55%, while similar aerobic preparations reduced growth by only 5-10%. The adverse effect on hypocotyl growth was much less than that on radicle growth. - P.J.B. [O.W.]

818. NORTHERN IRELAND, RESEARCH AND EXPERIMENTAL RECORD OF THE MINISTRY OF AGRICULTURE. Res.exp.Rec.Min.Agric.N.Ire., 1959, 9,(2), pp.202.

p.204. Potatoes. All post-em. sprays caused severe leaf distortion, mecoprop causing the greatest injury and MCPB the least. Simazine pre-em. was promising for the control of young weeds.

p.251-4. Ranunculus repens has been well controlled by MCPA (salt and ester) and 2,4-DB (ester), but only fair control was obtained with 2,4-D (salt and ester) and with salts of MCPB, 2,4-DB and mecoprop. Complete control of established Stellaria media was obtained with November applications of: mecoprop 1 #, chlorpropham 1 #, simazine 1 #, atrazine 0.5 #, diquat 0.25 #, amitrole (activated) 2 #, dinoseb (amine) 4 # and dinoseb (ammonium) 3 #.

p.251. Chemical weed control. (Trials during 1959). Of various auxin herbicides tried at 0.5-2 #, 2,4,5-T (amine and ester) gave the best control of Urtica dioica and was better alone than in mixtures with 2,4-D, or MCPA containing the same total a.e. Good top kill was also given by 2,4-D and MCPA (salt or ester) and by mecoprop (salt); 2,4-DB, MCPB and MCPA + 2,3,6-TBA were less effective. There was little difference in short-term results between spring, summer, or autumn applications.

Apples. 2,4,5-T 10 # caused slight stunting and leaf injury when applied to the ground

round recently planted apple M XIII root-stocks, but 2,4,5-T + 2,4-D at rates up to 2% applied in the spring round established apples caused no injury or reduction in crop yield.

Blackcurrants. Further trials confirmed the high degree of tolerance to dalapon which, at 3700 p.p.m. sprayed to the point of run-off caused no damage at any stage to var. Boskoop Giant when leafless and only slight marginal chlorosis and necrosis and a reduction in leaf size if sprayed when leaves were unfolding. Directed applications of 14.8 % during the dormant period or of 5.4 % in the growing season caused no injury.

When var. Seabrook's Black was sprayed to the point of run-off on 30th January with various herbicides at 1000 p.p.m., MCPB (salt) caused the least injury and did not affect yield; MCPA caused similar slight effects but most of the fruit dropped before ripening; 2,4-D and 2,4-DB (salt and esters) caused very severe injury when applied as directed sprays in late autumn; risk of injury from MCPB or MCPA appears very slight, and MCPB 2 % in October is recommended for control of R. repens. Simazine and atrazine 2 and 4 % gave better control of germinating weeds than propazine or trietazine, without injuring bushes.

Raspberries. Dalapon 3.7 % caused injury to var. Lloyd George when applied as a directed spray in October and November; when applied between December and April, fruiting canes were uninjured, but young canes were slightly injured and received temporary growth check from March and April applications. In another trial dalapon 7.4 % applied in December to several varieties, caused no injury. Rates of 3.7 % applied to the same plots in December 1957 and 1958 also had no adverse effect. The safest time for use of dalapon in raspberries at Loughgall appears to be late November, December or January.

Salt formulations of MCPA and MCPB and salts and esters of 2,4-D and 2,4-DB applied to Lloyd George as directed sprays at 2 % and overall at 1000 p.p.m. in January caused no apparent injury, but similar applications of 2,4,5-T (ester) were very injurious. No apparent injury was caused by MCPA applied as a directed spray at 2 % to Lloyd George between October and March or when applied to the same plots in December 1957, 1958 and 1959 to vars. Malling Jewel, Malling Landmark and Seedling V.

Various treatments with simazine at rates up to 4 % and at 8 and 16 % applied in narrow bands, demonstrated a high degree of tolerance in raspberries; 1,2 and 4 % applied to the same plots of Malling Exploit 2 years running had no significant effect on yield or vigour at the end of 2 years, although fruit yield was slightly reduced by 4 %. Propazine and trietazine at rates up to 4 % were equally harmless to fruiting canes but less effective against weeds. Atrazine 2 % had no harmful effects in a raspberry spawn bed and gave slightly better and just as persistent weed control as simazine.

Strawberries. (1) Post-harvest. Tar oil, dinoseb, emulsifiable formulations of PCP, and formulations of cresylic acid gave good results in conjunction with mechanical defoliation, for controlling weeds after harvest, although Poa annua tended to develop rapidly in the absence of competition. Strawberry leaves not removed were burned by these chemicals, but recovery was rapid and complete. PCP 3 % + simazine or atrazine 1.5 % applied in late July to defoliated plants gave excellent post harvest weed control with only slight temporary check to strawberries, but the effect on the next year's yield is not known. (2) Spring application. Simazine 1.5 % applied in the spring caused severe stunting in 1 trial, slight damage in a second trial and no damage in a third; 0.75 % caused no injury, but gave poor weed control when applied during a long drought.

In a trial on the control of R. repens in strawberries, 2,4-D was less injurious than MCPA and in 1 trial 2,4-D (sodium) 1 and 2 % applied in February gave good control of young buttercups without adverse effect on vars. Vigour or Talisman.

Scallions (spring onions). Sulphuric acid 3.5% v/v was satisfactory post-em., but higher concentrations caused severe scorching; however, Fumaria officinalis Polygonum persicaria and Chenopodium album were not killed when past the seedling stage and a pre-em. herbicide is advised followed if necessary by sulphuric acid 3-3.5%. -- D.M.L.S. [O.W.]

810. NORWAY, NORDISK JORDBRUGSFORSKNING. Resultater av nordiske fellesplauer for bekjempelse av ugras i korn@er. [Results of the associated Scandinavian plan for the control of weeds in grainfields.] Nord. JordbrForskn. 1960, Suppl. 1. 127-31.

In experiments carried out in Denmark on stands of barley containing 5.1% weeds, applying MCPA increased grain yields by 0.9 kg, while DNOC increased yields by 1.9 kg, yet gave no better weed control [rates of herbicide not given]. A mixture of the 2 chemicals, at full strength, gave good weed control. DNOC reduced the yield of an oat crop containing 3.1% weeds. In trials in Finland, MCPA at 1-1.5 kg/ha increased grain yields of cereals by 5-13%. In Norwegian trials, Stellaria media and Spergula arvensis were best controlled with

MCPA + dinoseb, and Polygonum spp. with MCPA + DNOC. - From Field Crop Abstr., 14. 609. - J.W.F.

820. * GOSTINCHAR, J. [The susceptibility of weeds in winter sown crops to selective herbicides based on 2,4-D and 2,4,5-T]. Agricultura Madrid, 1958, 27, 125-30.

821. NAKOMSHNY, W. and FRIESEN, G. Univ. Manitoba, Winnipeg, Canada. The influence of a commercial fertilizer treatment on weed competition in spring sown wheat. Canad. J. Plant Sci., 1961, 41, (2), 231-7, tabs. 4, bibl. 14.

Plots at 6 locations on loam and clay-loam soils in Manitoba were summer fallowed in the previous year and sown to wheat with or without ammonium phosphate (11-48-0) NPK at 40 # drilled at the same time as the wheat was sown. The plots were then either maintained in a weed-free condition, or were left unweeded. At 4 out of 6 locations, Avena fatua and Sinapis arvensis predominated and at the remaining 2 locations, A. fatua, Polygonum convolvulus and Galeopsis tetrahit were dormant. The average grain yields on weed-free and weedy unfertilized plots were 35.6 and 28.0 bushels/ac and on weed-free and weedy fertilized plots, 41.4 and 36.6 bushels, respectively. The average grain yield increases brought about by applying fertilizer were of the same order as those resulting from weed control. The average grain yield losses caused by weeds on fertilized and non-fertilized plots were 11.7 and 20.5%, respectively, indicating that the use of fertilizers was able to offset to a considerable degree yield losses caused by weeds. Increases in the protein content of the grain as a result of weed removal were significant at 3 out of 6 locations. Fertilizer applications resulted in significant reductions in protein contents at 2 out of 6 locations under weed-free conditions; the removal of weeds to some extent offset these reductions. - P.J.B. [O.W.]

822. JOHANSON, N.G. and MUZIK, T.J. (Washington Agric. Exp. Sta., Pullman, U.S.A.) Some effects of 2,4-D on wheat yield and root growth. Bot. Gaz., 1961, 122, (3), 188-94, figs. 10, tabs. 2, bibl. 14.

In field trials, the winter wheat varieties Omar, Brevor and Burt and the spring wheats Marfed, Idaed and Henry were treated post-em. with 2,4-D at different growth stages. Brevor appeared to be more susceptible to damage from 2,4-D than the other varieties and the isopropyl ester was more toxic than the amine salt. Spike abnormalities including curvature and doubling of the rachis occurred in wheat sprayed at either the seedling or the boot stages. Immersing wheat seeds for 1 to 5 hours in 100 p.p.m. solutions of 2,4-D amine or ester resulted in the production of seedlings with thickened and fasciated roots. Stems were less affected than roots and spring wheats were less damaged than winter wheats. In glasshouse studies, seedlings of the variety Brevor were grown in vermiculite in boxes with a glass side to permit root observations to be made. Foliar treatment with 2000 p.p.m. solutions of 2,4-D as solubilized acid stimulated elongation of the primary root, but inhibited lateral root development. Similar treatment with 1000, 2000 and 4000 p.p.m. isopropyl ester stopped root growth within a few hours and the plants died within 24 hours. Foliar treatment with the triethanolamine salt at 1000, 2000 and 4000 p.p.m. reduced root elongation while a concentration of 500 p.p.m. stimulated it; all treatments caused shortening of the lateral roots and swelling of both lateral roots and culm bases. Applications of 2,4-D made directly to the roots produced only localized growth responses. P.J.B. [O.W.]

823. *KOZHASOV, O.S. [Economics of the use of herbicides in grain culture]. Zashch. Rast. ot Vred. i Bolezmei, 1960, (4), 13-14 (Russ.).

824. DAVIES, D.J.G. (Dep. Agric., Christchurch, New Zealand). Maize for summer green feed. N.Z.J. Agric., 1961, 102, (1), 17-19, p. 19. Weed control. Includes the information that a mixture of 1.5 # each of simazine and atrazine applied immediately after drilling the maize has given excellent control of annual weeds and higher yields than where 2,4-D was applied. - D.M.L.S. [O.M.]

825. SOUTH AFRICA, FARMING IN SOUTH AFRICA. Competition between maize and weeds. Farm S. Afr., 1960, 36, (6), 27-9, figs. 3.

Experiments have shown that weeds reduced maize yield by 13 bags/morgen [1 morgen = 2.117 ac] when 500 lb of superphosphate was applied, but when 1000 lb of superphosphate + 600 lb of ammonium sulphate were applied, the loss was 21 bags/morgen. Maize on weed-free land reacted favourably to each increase in the amount of fertilizer applied up to an optimum level of 800 lb of superphosphate + 400 lb ammonium sulphate/morgen. Severe weed infestation retarded tasselling by ca. 9 days, and lengthened the period between plume and beard formation by ca. 3-4 days. - J.W.F. [G.R.I.]

826. HATTINGH, I.D. and van WYK, S.P. Save my maize! How? Methods and costs. Fmg S.Afr., 1960, 36,(6),33-8, figs.5,tabs.4.
An analysis of weed control costs is given and indicates that there is little difference in cost between mechanical and chemical control; both cost less than 2 bags of maize/morgen [1 morgen = 2.117 ac]. Considerations in the choice of weed control methods are reviewed briefly. - J.W.F. [G.R.I.]

827. LAST, F.T. (Rothamsted Exp.Sta., Harpenden,Herts,England). Direct and residual effects of Striga control treatments on sorghum yields. Trop.Agric.Trin., 1961, 38 (1),49-56, figs.1,tabs.2,bibl.22.
Sorghum crops were grown in 1958 to assess the residual effects of treatments applied in 1957 to control Striga hermonthica. Trap-cropping with Sudan grass grown for 5 weeks, but not for 3, before sowing sorghum significantly decreased the incidence of S. hermonthica and increased grain yields of sorghum sown in both 1957 and 1958 by 500 %; in the first season straw yields were decreased.
Spraying with 0.8-1.6 % of 2,4-D (sodium) 2-3 weeks after sowing delayed emergence of S. hermonthica and increased sorghum grain and straw yields in 1957, but had no residual effect in 1958.
Applying 80 # N and 40 % P in 1957 increased sorghum yields in both 1957 and 1958. In 1957 the increases varied with the time of application; applying at sowing and at 3, 6, and 9 weeks later increased grain yields from 905 to 3510, 3790, 3000 and 1440 %, respectively. In 1958 the residual effect, an increase of from 2150-3210 % of grain, was the same for all dates of application. The fertilizer application in 1957 did not significantly affect the evidence of S. hermonthica in 1957 but greatly reduced it in the second 1958 crop. Author's summary modified. - D.M.L.S. [11(624)]

828. CORBETTA, G. Nuovi orientamenti ed inconvenienti in risicoltura. [Recent trends and disadvantages in rice culture]. Riso, 1960, 9,(7),7-9,(It.).
Control of Echinochloa crus-galli by means of high-level (15-20 cm) irrigation of the rice fields can be very efficacious if carried out carefully, but it may (1) encourage growth of algae, (2) reduce the germination and emergence of rice which has been subjected to pre-germination techniques, and (3) increase infestations of Triops cancriformis. These disadvantages are discussed and some counter measures recommended. - D.M.L.S. [G.R.I.]

829. VASCONCELLOS, J.de C.E. (Instituto Superior de Agronomia,Lisbon,Portugal.) Evolucao da vegetacao infestante dos arrozais no concelho da Azambuja. [Evolution of weeds in the rice fields of Azambuja municipality.] Publ.Com.reg. Comercio Arroz,Lisbon, 1959, pp.54, (Portuguese e.), figs.4,tabs.4,bibl.17.
A record of the presence and frequency of rice field weeds in 5 localities based on 7 weed counts between 5th April and 9th September. - D.M.L.S. [3(46.9)]

830. MOFFATT, J.R. and HILL, M.J. The use of "Simazine" to control weeds in field beans and potatoes. Rep.Rothamsted Exptl Sta. 1960, 1961, 204-8.
In trials in which winter wheat, spring barley, oats, thousand-head kale and sugar beet were sown in strips across plots on heavy loam and sandy loam soils treated during the previous year with simazine at 0.5, 1 and 1.5 % and atrazine 1 %, there was no evidence that simazine at 1 %, would be likely to injure following crops, including autumn-sown wheat. In trials in 1960, tick beans were sown 3-4 in. deep on heavy and light loam soils and treated with simazine at 0.5, 1 and 1.5 % without inter-row cultivation, applied shortly after sowing and with simazine 1 % with inter-row cultivation. Potatoes were treated (a) with simazine 0.5 and 1 % immediately after planting with no inter-row cultivations, (b) simazine 1 % with one final earthing-up and (c) simazine 1 % applied just before emergence. In the bean trials, simazine alone did not control weeds satisfactorily. Dormant weeds were Galium aparine, Polygonum convolvulus, Atriplex patula and Polygonum aviculare. Mechanical cultivation controlled these satisfactorily, but simazine controlled only P. convolvulus satisfactorily. The total number of annual weeds, however, decreased as the rate of simazine increased. In potatoes, simazine alone had less effect on weed populations than did normal inter-row cultivations, and tuber yields where normal cultivations were used were higher than with simazine alone or simazine + cultivation, irrespective of the degree of weed control. Rainfall appeared to be critical in determining the herbicidal effectiveness of simazine. - P.J.B. [O.W.]

831. HANF, M. (Landw.Versuchsstation der B.A.S.F.,Limburgerhof,W.Germany). Experience with Alipur (HS.55) in sugar beet. Agric.Vet.Chem., 1961, 2,(2),69-72.

The results of trials with HS 55 (OMU + BiPc; N-cyclooctyl-N'N-dimethylurea + butinol-N-(3-chlorophenyl) carbamate) are reviewed. In more than 600 trials in Germany, HS 55 applied pre-em. to sugar beet gave good control of Chenopodium album, Atriplex spp., Polygonum spp., Raphanus sp., Sinapis sp., Stellaria media, Veronica sp., Thlaspi arvense, Capsella bursa-pastoris, Matricaria spp., Fumaria sp., Poa annua, Viola tricolor, Papaver spp., Centaurea cyanus, Spergula arvensis, Myosotis sp., Urtica urens and Senecio vulgaris. Partial control was secured with Galeopsis sp., Lamium sp., Vicia spp., Ranunculus arvensis, Galinsoga parviflora, Mercurialis annua and Amaranthus sp. Poor control was secured with Galium aparine, Sonchus spp., Rumex spp., Avena fatua and Euphorbia spp. Data of the frequency of different weeds in beet fields in Germany indicated that Chenopodium sp., Atriplex spp., Polygonum spp., Raphanus sp., Sinapis sp. and Stellaria media occurred in >50% of fields surveyed, while Veronica sp. and Thlaspi arvense occurred in 25-49% of fields. Weeds germinating at depths of >2 cm were not greatly affected by the herbicide and weed control in dry conditions was often unsatisfactory. Evidence is given to support the contention that HS 55 does not reduce sugar beet yields to any great extent. - P.J.B. [O.W.]

832. SEKSMITH, J.J. (Agric.Res.Sta., Lethbridge, Alberta, Canada). Chemical control of wild oats (Avena fatua L.) in sugar beets. J.Amer.Soc.Sug.Beet Technol., 1960, 11, (3), 268-78, figs.2, tabs.4, bibl.9.

Pre-sowing. In trials where herbicides were applied pre-sowing and disked in, propham was tested for 5 years, DCU. TCA and CDAA for 3, chlorpropham and EPTC for 2, and endothal and diallate for 1 year only. The only treatments to give 85% control or more of A. fatua were propham 6 and 8 #, EPTC 2-8 #, and diallate 2, 4 and 6 #. Moderate control was obtained with chlorpropham 4 and 6 #, CDAA 6 and 8 # and TCA 10 and 15 # while poor results were obtained with DCU 5, 10 and 15 # and endothal 4-8 #. Reasonable control of Setaria viridis was obtained with chlorpropham, DCU, TCA, CDAA and EPTC.

Unthinned beet stand reductions of 58 and 55% were caused by EPTC 6 and 8 # respectively in 1958; in 1959 reductions were caused by the higher rates of all herbicides, the most serious being 43% with CDAA 8 #, but the thinned stands were not adversely affected. No treatment reduced crop yield and increases resulted from most treatments. TCA 10 and 15 # and CDAA 4 and 6 # resulted in significant yield increases based on 3 year data.

Post-em. With applications made when beet was in the early 2-4 leaf stage and A. fatua in the 3-6 leaf stage, dalapon 4 and 6 # suppressed A. fatua growth by about 50 and 70% and was equally effective against S. viridis. TCA 8 # was less effective against A. fatua, but more so against S. viridis. Neither herbicide killed A. fatua within a 2-3 week period prior to hand weeding. Beet stands were not affected, but dalapon 6 # significantly reduced beet yields.

Sucrose content of the beet was not adversely affected by any treatment. Author's Summary modified. - D.M.L.S. [249(71)]

833. BEHRENS, R. and SOINE, O.C. (Minnesota Agric.Exp.Sta., St.Paul, U.S.A.). Evaluation of herbicides for weed control in flax. Proc. 29th Annu.Flax Inst., U.S., 1959, 17.

In trials at 2 locations in Minnesota, pre-sowing, soil-incorporated applications of EPTC 1.5 and 3 # and amiben 2 # were made to Wanlegan silt loam on 30th April, 1959 and flax was sown on the same day. Pre-em. applications of amiben 2 and 6 # were made on the day after sowing. The pre-sowing treatments with EPTC 3 # and amiben 2 # reduced flax stands by 20%. Amiben pre-em. at 2 and 6 # reduced stands by 5 and 35%, respectively. EPTC at the 1.5 and 3 # rates reduced stands of Amaranthus retroflexus, Kochia scoparia, Chenopodium album, Polygonum persicaria and P. convolvulus by 20 and 70%, respectively; annual grasses, including Echinochloa crus-galli and Setaria spp., were reduced by 55 and 85%, respectively. Amiben 2 # pre-sowing and pre-em. reduced annual broad-leaf and grass weeds by about 75% and 6 # (pre-em.) by 95%. Undersown lucerne was not injured by EPTC but was eliminated by all amiben treatments. Post-em. applications of barban at 0.25, 0.5, 1 and 2 # made to flax on Fargo clay soil when wild oats were at the 2 leaf stage reduced flax stands by 0, 2, 25 and 40%, and reduced wild oat populations by 20, 30, 30 and 30%, respectively. - P.J.B. [O.W.]

834. BAKER, A.L. (Iowa State., Ames, U.S.A.) Effect of a number of herbicides in the control of weeds in flax. Proc.29th Annu. Flax Inst., U.S., 1959, 18-22, tabs.2.

Data are given of the yields of flax in trials in Iowa during 1959 in which the crop was sown on 13th April, sprayed on 22nd May when the flax was 3-5 in. high, and harvested on 20th July. Treatments used were: 2,4-D amine 0.25 #, 2,4-DB 4 #, Esteron 99 (70.5% 2,4-D propylene glycol butyl ether esters) 0.25 #, MCPA 0.25 #, dalapon 1 #, 2,4-D low-volatile ester 0.25 #, TCA 5 # and TCA 5 # + MCPA 0.25 #. 2,4-D PGBE ester retarded the

growth of the flax initially. Highest flax seed yields were given by crops treated with 2,4-D amine, 2,4-DB and MCPA, which out-yielded untreated controls by about 6 bushels/ac. In further trials in which EPTC, CDAA and simazine at 5 ℔ were applied at the time of sowing, EPTC gave best weed control and resulted in highest seed yields (14.3 bushels/ac. compared with 8.4 bushels for controls). P.J.B. [O.W.]

835. SZATALA, O. (Res. Inst. Plant Prot., Budapest, Hungary). Vegyszeres gyomirtasi kiserletek rostes olajlen vetesekben. [Experiments in the chemical control of weeds in fibre- and oil-flax]. Kiserl. Kozl. 1959, 52A, (4), 111-46, (Russ. russ. g.), bibl. 113.
Trials were made from 1955 to 1957 to test 7 Hungarian and 8 foreign preparations based on DNOC, dinoseb and MCPA. The trial plants were Beta oil flax and Concurrent fibre flax. Spraying was done once or twice when the plants had attained heights of 4-6, 8-12, 15 and 20 cm. They were resistant to DNOC and dinoseb when 4 to 15 cm and to MCPA when 8 to 15 cm high. The best time for spraying was when the flax was 8 to 12 cm high. The Hungarian Krezonite F paste (DNOC-Na) effected good destruction of annual and less resistant weed species. The Hungarian Nikrezil paste, based on MCPA, was satisfactory in destroying perennial and more resistant weeds, while similar good results were obtained from the mixture Nikrezil paste + Krezonite F. This last named mixture also prevented the incidence of resistant weed mutants. Spraying too early (4-6 cm height), too late (20-22 cm), and twice had a detrimental effect on seed- and oil-yield, germination capacity, 1000-grain weight, stem length and fibre yield and quality, and also produced symptoms of physiological disturbance. Under optimal conditions, however, the use of the weedkillers had a tendency to stimulate flax. No significant difference was perceptible between oil- and fibre-flax in sensitivity to the weedkillers, although the tolerance of oil flax towards MCPA products was about 10 to 20% higher than in fibre flax. Weather is important; too high air relative humidity is as unfavourable as a period of drought. Optimum temperature is 18-25°C. At lower temperatures the effect of the weedkillers is reduced or disappears, at higher temperatures phytotoxic effects result. After spraying, a rain-free period of at least 4-6 hours is desirable. From Field Crop Abstr. 14, 834. - J.W.F.

836. PORTER, W.K., THOMAS, C.H., SLOANE, L.W. and MELVILLE, D.R. Weed control in cotton. Circ. Louisiana agric. Exp. Sta., 1960, 61, pp. 12 figs. 7, tabs. 2.
Recommendations are given for seedbed preparation and sowing of cotton in preparation for combined chemical and mechanical methods of weed control, and for the pre-em. application of chlorpropham and diuron and the post-em. application of herbicidal oils and the use of flaming. A guide is given for the calibration of spray equipment for pre- and post-em. use. P.J.B. [32(76.3)]

837. RAY, H.E. (Univ. Arizona, Tucson, U.S.A.). How to obtain best results from chemical defoliation of cotton. Agric. Chemic., 1961, 16, (5), 58, 60 and 96-7, bibl. 4.
Factors which influence the effectiveness of defoliants used on cotton are reviewed and recommendations for optimum management procedures given. - P.J.B. [O.W.]

838. McCREATH, J.B. (W. of Scotland Coll. Agric., Glasgow, Scotland). Some economic aspects of grazing improvement on hill farms. Proc. 1st Brit. Conf. on Impvt of Marginal Land by Oversowing after Dalapon Treatment, 1960, 6-16.
Costs and returns are given for the following conventional methods of improvement used on 3 hill farms in Scotland: (a) direct reseeding under a nurse crop of rape, (b) reseeding after a pioneer crop of rape and Italian ryegrass, (c) harrowing followed by oversowing. - P.J.B. [O.W.]

839. HUNTER, R.F. (Hill Fmg Res. Org., Edinburgh, Scotland). The place of oversowing on hill farms. Proc. 1st Brit. Conf. on Impvt of Marginal Land by Oversowing after Dalapon Treatment, 1960, 17-23.
The natural variations in sward type and soil characteristics on hill grazings are reviewed briefly. Three possible uses for dalapon on hill grazings are itemized. They are: (a) at rates sufficient to selectively suppress Nardus stricta in mixed N. stricta/Deschampsia flexuosa/Agrostis spp. swards, together with lime and phosphate, with no further treatment; (b) dalapon at low rates (5 ℔) to suppress N. stricta and Molinia caerulea in communities where they are dominant, with lime and phosphate before spraying and oversowing with white clover 5-6 weeks after spraying; (c) dalapon at rates high enough to give complete sward kill, together with fertilizers and oversowing; (b) was considered the cheapest and most useful way of using dalapon. From trial results, the following tentative procedure seemed

best for oversowing: spray in autumn, oversow in early spring (at least in E. Scotland), apply lime one year before spraying (or high-solubility basic slag immediately after spraying), together with complete fertilizer after oversowing.
P.J.B. [O.W.]

840. HUNT, I.V. (W. of Scotland Agric. Coll., Glasgow, Scotland). The improvement of grassland by oversowing. Proc. 1st Brit. Conf. on Impvt of Marginal Land by Oversowing after Dalapon Treatment, 1960, 33-45.
The environment of hill grazings, and methods and techniques available for improving them are reviewed. - P.J.B. [O.W.]

841. GARDNER, A.L. (W. of Scotland Agric. Coll., Glasgow, Scotland.) Grassland improvement by chemical techniques. Proc. 1st Brit. Conf. on Impvt of Marginal Land by Oversowing after Dalapon Treatment, 1960, 46-53.
Different methods of improving hill grazings are reviewed briefly. From trials in Scotland, it is concluded that dalapon 20 # will give permanent kill of most grasses, 5 # will reduce competition from old swards sufficiently to permit reasonable establishment of oversown species, especially when accompanied by harrowing while 2-2.5 # is sufficient to give temporary suppression of grasses to encourage clover. - P.J.B. [O.W.]

842. BANFIELD, G.L. (Dep. Agric., Dunedin, New Zealand). Aerial top dressing and molybdenised superphosphate on a Coromandel hill country store sheep and cattle farm. N.Z.J.Agric., 1960, 101, (5), 474-84.
Manuka [Leptospermum scoparium], tauhinu [Pomaderris phylicaefolia], and Spanish heath [Erica lusitanica] are controlled by burning followed by oversowing and heavy topdressing. - D.M.L.S. [O.RE.]

843. FERGUS, E.N. and HOLLOWELL, E.A. (Agric. Exp. Sta., Lexington, Kentucky, U.S.A.) Red Clover. Advanc. Agron., 1960, 12, 365-436, bibl. 366.
A review which includes a short section (VIII, p.390) on weeds of red clover fields in the United States. The most objectionable of these are named. - D.M.L.S. [O.RE.]

844. * FOMINA, A.A. [Utilization of 2.4-D herbicide for weed eradication in meadows]. Zashch. Rast. ot Vred. i Boleznei, 1960, (1), 25-6. (Russ.).

845. MEEKLAH, W.F.A. (Invermay Agric. Res. Sta., New Zealand). Poa annua in established lucerne. N.Z.J.Agric., 1961, 102, (2), 188, tabs. 1.
Two trials, in the spring of 1957 and 1958, are described. The main results were that chemical methods were better than mechanical and dalapon was better than TCA (10-15 #). Though lucerne is most tolerant to dalapon at rates not exceeding 2 #, it may be better to apply 3 # in order to minimize reinfestation with P. annua the following season. Dalapon 2 # controlled P. annua with only a slight check to the lucerne; though total yield was not significantly different from the control, yield of lucerne was 14% higher. Dalapon caused a significant reduction in total yield, but increased lucerne yield. Respraying is probably necessary to control P. annua where a rate as low as 2 # is used. - D.M.L.S. [O.RE.]

846. PIENAAR, A.J. and LIEBENBERG, L.C.C. Weed encroachment in the Transvaal Region. Fmg S.Afr., 1960, 36, (6), 30-2, figs. 2.
Veld management to prevent the spread of undesirable grasses, the use of goats and burning to control brush species, and the use of 2.4-D to control herbaceous weeds, are discussed. - J.W.F. [G.R.I.]

847. ROBBERTSE, P.J. (Seed Inspection Serv. Pretoria, South Africa). Check that seed - it may be infested with weeds. Fmg S.Afr., 1960, 36, (6) 39-40, figs. 1, tabs. 1.
A table indicating the most important weed seeds found in seed samples of the major crops together with their number, shows that seeds of the greatest range of species are found in small seeded crops. Act No. 36 (1947) states that seed may not be sold in S. Africa if it contains >50 weed seeds/oz, or > 0.5% weed seeds/weight of seed; also, seed containing dodder [Cuscuta spp.] may not be sold. - J.W.F. [G.R.I.]

HORTICULTURAL, ORNAMENTAL AND PLANTATION CROPS

848. NORWAY, STATENS PLANTEVERN. Kjemisk ugrastyning i gulrot. [Chemical weed control in carrots]. Småskr. Stat. Plantevern, 1961, 14/60, pp. 3.
Recommendations are given for the use of sulphuric acid and mineral oil. - P.J.B. [58(481)]

849. *KANOV. T.IA. Chemical weeding of carrots. Zashch.Rast.ot Vred.i Boleznei, 1960, (5), 18-19, (Russ.).

850. MENGES, R.M. (Agric.Exp.Sta., Weslaco, Texas, U.S.A.) Pre-emergence chemical weed control in cabbage. J.Rio Grande Val.Hort. Soc., 1960, 14, 132-9.
In 2 trials on clay and sand where plots were furrow-irrigated fortnightly after treatment, CDEC was the best of several herbicides and at 6-8 # gave ca. 82% control of weeds (mainly Amaranthus palmeri on sand and A. palmeri, Echinochloa colonum and Portulaca oleracea on clay) without causing injury or reducing yield. Stoddard solvent 20 gal/ac, 2-chloro-4,6-bis (diethylamino)-s-triazine (chlorazine) 3 # + chlorpropham 6 # and EPTC 4 and 6 # also gave good results on clay, though cabbages were temporarily stunted by EPTC 6 #. The following either caused injury or reduced yield: neburon 2.5 and 5 #, octachlorohexenone 10 and 15 #, chlorazine 6 #, and (when plots were hand-raked before treatment) chlorpropham 9 #. Weed control was poor on clay with chlorazine 3 #, 1-chloro-2 propyl N-(3-chlorophenyl) carbamate 6 and 9 #, and TCA 6 and 12 #, and on sand with CDEC 4 # (when not incorporated), chlorpropham 6-10 #, EPTC 3 and 6 #, TCA 8 and 12 # and combinations at low rates of CDEC with chlorpropham, EPTC and TCA and of EPTC and chlorpropham. D.M.L.S. [133(76.4)]

851. VORSTER, S.F. (Stellenbosch-Elsenburg College of Agric., S.Africa). Keep tobacco seedbeds free of weeds. Fmg S. Afr., 1960, 36, (6), 9-10, figs.3, tabs.1.
Heat sterilization, by steam or burning, and chemical sterilization using the following chemicals, are discussed:- calcium cyanamide mixed with the topsoil at a rate of 1 lb/yd^2, urea 1 lb/yd^2, or mixed with calcium cyanamide and used at 1.5 lb/yd^2, Chloropicrin at 1.5 lb/ft^2 injected into the soil, methyl bromide liquid released under a plastic sheet covering the seedbed, and drenches SMDC, DMTT, and allyl alcohol, applied with a watering can. - J.W.F. [G.R.I.]

852. KOFRANEK, A.M. and LEISER, A.T. (Univ.California, Los Angeles, U.S.A.) Chemical defoliation of Hydrangea macrophylla, Ser. Amer.Soc.Hort.Sci.Proc. 1958, 71, 555-562, figs.2, tabs.2, bibl.4.
As a defoliant treatment for H. macrophylla prior to placing them in cold conditions to induce flower bud development, Vapam (31% solution of sodium methyl dithiocarbamate) at 2.5-5 ml/l applied at 0.5 pint/ft^2 of soil and vaporized in 10 cu.ft of air space resulted in complete defoliation after exposure for 16 hours. The 5 ml/l rate caused some root injury with a consequent tendency for the plants to wilt when forced. Folex (75% emulsion of tributyl phosphorotrithioite) as a 2% emulsion applied as a spray also gave virtually complete defoliation, but also caused some phytotoxicity. For practical use, it was concluded that the use of 1% Folex emulsion spray at 7-10 days before cold treatment was the most feasible. - P.J.B. [216(79.4)]

853. DAWSON, R.B. Lawns. Penguin Handbook, 1960, 56, pp.176, 6/-.
Includes information on weed control.

854. HUSSER, H.B. (Pennsylvania State Univ., University Park, U.S.A.). Fertilizer use and weed control. Proc. 1960 Midw.Reg. Turf Conf., [n.d.], 15-18.
Observations are made on the timing of fertilizer applications to turf in relation to the control of weeds, especially Poa annua, Stellaria media and Digitaria spp. - P.J.B. [O.W.]

855. DANIEL, W.H. (Purdue Univ., Lafayette, Indiana, U.S.A.). Solving the Poa annua problem. Proc. 1960 Midw.Reg. Turf Conf., [n.d.], 23-7.
Recommendations based on trials at Purdue and other Experiment Stations, are given for the use of calcium arsenite for the control of Poa annua in lawns, golf fairways and putting greens, using a standard rate of treatment of 12 lb/1000 ft^2. Trial results with other herbicides for controlling Poa annua are reviewed briefly. P.J.B. [O.W.]

856. GALLAGHER, J.E. and OTTEN, R.J. (Agric.Chem.Res.Dep., Amchem Products, Inc., Ambler, Pennsylvania, U.S.A.). New organic arsenical materials for pre-emergence crabgrass control. Hormolog, 1961, 3, (1), 11-13.
In the trials reported, the following herbicides were used: tricalcium arsenate (commercial formulation containing 47.2% tricalcium arsenate + 0.38% 2,4-D + 0.13% 2,4,5-TP) applied at the equivalent of 10 lb 85% tricalcium arsenate/1000 ft^2, chlordane (1,2,4,5,6,7,8,8-octachloro-4,7-methano-3a,4,7,7a-tetrahydroindane) 1.2 lb/1000 ft^2, Dacthal (2,3,4,6-tetrachloro terephthalic acid) 10 #, Zytron (O-(2,4-dichlorophenyl)-O-methyl isopropylphosphoroamidothioate) 15 #, calcium propyl

arsonate 0.75 or 1.5 lb/1000 ft^2. In trials on the pre-em. control of Digitaria spp., out of more than 50 treatments applied in 1960, these were the most effective. In trials in which pre-em. control of Digitaria spp., tolerance to sown and to seedling turf grasses were assessed, calcium propyl arsonate at the two rates used gave >80% pre-em. control of Digitaria spp. and caused little injury to sown or seedling grasses. Zytron and especially Dacthal gave very good pre-em. control of Digitaria spp., but prevented the growth of turf grasses sown after treatment, though they had little effect on seedling turf grasses. Tricalcium arsenate + 2,4-D + 2,4,5-TP was less effective than Zytron, Dacthal and calcium propyl arsonate against Digitaria spp. and chlordane gave very inferior results.
P.J.B. [O.W.]

857. STRYCKERS, J. (Rijkslandbouwhogesch, Gent, Belgium). De toepassing van herbiciden onder laagstamfruit in bessen - en frambozenculturen. [The use of herbicides under bush fruits in currant and raspberry culture]. Ons Fruitteltblad, 1961, 5,46-51, (Du.).

Herbicides suitable for controlling annual weeds such as Stellaria media and Poa annua in bush and cane fruits are listed. The residual effect of these (propham, chlorpropham, BiPc (butinol N-(3-chlorophenyl) carbamate or BiPc + OMU (cyclooctyl N-dimethyl urea), the latter of which will also control Senecio vulgaris) is usually about 6-8 weeks when applied in early spring, after which period infestation with late-germinating weeds such as Galinsoga parviflora may occur. The use of simazine (1-2 kg/ha) and neburon (4 kg/ha) for long-term weed control is reviewed. These herbicides are best applied during February to April. Perennial weeds such as Agropyron repens, Agrostis spp. and Holcus lanatus are difficult to control with these herbicides, though applications of simazine 1.5-3 kg/ha in November to December have given satisfactory control of A. repens in some cases. The possibility of using atrazine and diuron (1.5-2 kg) to control these weeds is indicated; where adequate tillage is not possible, atrazine or diuron + amitrol 2 kg/ha applied for preference, in early spring when the plants are still dormant shows promise. Amitrol 2 kg/ha + fenac 2 kg/ha has given good results as a wide-spectrum herbicide for use with relatively older pear and apple trees and in currant crops.
P.J.B. [106(493)]

858. NORTHERN IRELAND, AGRICULTURE IN NORTHERN IRELAND. Chemical weed control in fruit crops. Agric.N.Ire., 1961, 35,(11), 337-8.

Simazine 1.5 # is safe for use in raspberries, gooseberries and blackcurrants and will control seedlings of annual meadow grass [Poa annua], chickweed [Stellaria media] and groundsel [Senecio vulgaris], but is not effective against buttercups [Ranunculus spp], or redshank [Polygonum persicaria] or against large, established weeds. It is best applied to clean ground in late winter or early spring, especially March. - D.M.L.S. [O.RE.]

859. MUKULA, J. and SÄKÖ, J. (Agric.Res. Centre, Helsinki Finland.) Chemical weed control in fruit crops. Experiments conducted in 1958-60. Publ.Finnish State Agric. Res.Board. 1961. 189, pp.26. (E., finnish), figs.4 tabs.5 bibl.47.

In trials in fruit crops on sandy soils in two districts of Finland in which oils (petrol diesel, stove and waste (used lubricating oil)) applied in mid July, 1958, the addition of aromatic extract (Good-Rite Oktone 100 g/100 l) or dinoseb (Sevtox 100 g/10 l) resulted in good kill of the tops of all weeds. Spraying at 14-day intervals throughout the growing season did not exhaust the rhizomes of perennial weeds, but, with the exception of Agropyron repens and Equisetum vulgare, most did during the following winter. Because of these two exceptions, the use of herbicidal oils could not be recommended for Finland. In trials with chlorates, the following were used: (a) 99% potassium chlorate, (b) 40% sodium chlorate + 57% borax + 1% monuron, and (c) 45% sodium chlorate + 55% sodium chloride, applied at rates of 2-5 kg/ha. All gave satisfactory control of the tops of annuals, broad-leaved perennials and E. vulgare, but not of the tops of A. repens. Compound (b) was the most effective and persistent. The rhizomes of A. repens and E. vulgare survived to a large extent, while those of Cirsium arvense, Sonchus arvensis and Tussilago farfara were completely killed. Treatments (b) and (c) caused some toxicity to apple trees in trials in 1957-8; in trials in 1959-60, in which (a) only was used, no symptoms of toxicity were noted. In trials with grass herbicides, TCA, dalapon and amitrol were used. TCA was effective against all annuals and, also at rates of 25-50 kg/ha, against A. repens on the sandy soils of these trials. TCA resulted in severe infestations of broad-leaved perennials and caused some damage to apple trees. Dalapon at 20 and 40 kg/ha was rather more effective than TCA against A. repens, but caused some injury to apples and was highly injurious to raspberries

Amitrol applied on 8th July killed the green shoots of all weeds at 8-16 kg/ha, and almost completely killed the rhizomes of C. arvense, S. arvensis, Taraxacum officinale, Aegopodium podograria and T. farfara and was the only herbicide to show effectiveness against E. vulgaris rhizomes. A. repens rhizomes showed considerable resistance to amitrol regardless of rate of treatment, Amitrole caused injury to apples and raspberries only when it contacted the leaves. In trials with monuron and neburon, monuron was highly effective against most weeds at rates of 8-20 kg 80% formulation, except on dry soils. Plantago spp. and E. vulgaris were resistant. The effect of monuron lasted for up to 3 years, but often severely injured apple trees. Neburon at 4.6 and 9.3 kg/ha did not exert any great effect on weeds, except annuals, until the end of the year of treatment. E. vulgaris was again resistant. The effect of neburon persisted for at least 2 years. It did not injure apple trees, but its slow action reduced its value for use against perennial orchard weeds. In trials with simazine, all annual weeds were killed by rates of 2.5 kg/ha, while most perennials required 12.5-25 kg. E. vulgaris was completely resistant. The residual effect of simazine at rates sufficient to give full weed control appeared to last for nearly 4 years, though weed growth began again within 1-2 years after treatment where low rates were used. Simazine, except at high rates of 25 kg/ha, caused little or no injury to apple trees or bush fruits; raspberries showed the greatest susceptibility and showed leaf-edge discoloration after treatment with 12.5 kg. Atrazine tested only in 1959 showed similar effectiveness to simazine, but at much smaller doses. In trials with herbicide mixtures, simazine + amitrol mixtures appeared best for combining effective clearance of top growth with control of regrowth. Of the herbicides tested, it was concluded that amitrol, simazine and atrazine were most suitable for weed control in fruit crops. The possible advantages of granular formulations for this use were stressed.
P.J.B. [19(471)]

860. CURTIS, O.F. (New York Agric.Exp.Sta., Geneva, New York, U.S.A.) Grass and weed killers around trees - experimental results. Proc.N.Y.Stat.hort.Soc., 1960, 232-5.

In trials in 1959, applications of simazine 4 % + amitrol 4 % in 100 gal spray to the soil round young apple trees in mid May after rotary tillage in the previous autumn, gave complete weed control during the growing season, and trees so treated showed significantly greater trunk growth during the same year than those tilled 4 times during the season to control weeds. - P.J.B. [130(74.7)]

861. ROCHECOUSTE, E. Weed control [in sugar cane]. Annu.Rep.Mauritius Sug.Indust. Res.Inst. 1960, 71-7.

1. Herbicidal value of substituted ureas and triazine compounds in the superhumid areas. In trials in 1959 and 1960 with residual herbicides applied to plant and ratoon canes, the following treatments were used with plant canes: monuron, diuron, simazine and atrazine, each alone at 5 %, simazine 8 %, monuron, diuron, simazine and atrazine each at 5 % + sodium chlorate 10 %, simazine 8 % + sodium chlorate 10 %, monuron, diuron, simazine and atrazine each at 5 % + TCA 10 %, monuron, diuron, simazine and atrazine, each at 5 % + TCA 10 % + sodium chlorate 10 %. With ratoon canes, the following were used: monuron, diuron and simazine each at 6 %, alone, or in mixture with sodium chlorate, TCA or dalapon 6 %, monuron, diuron and simazine, each at 4 % + sodium chlorate 6 %, atrazine 6 % + sodium chlorate 6 %, monuron, diuron, simazine and atrazine, each at 4 % + sodium chlorate 6 % + TCA 6 %. As assessed 4 months after treatment, diuron 5 % + sodium chlorate 10 % was the best treatment with plant canes. With ratoon canes, diuron 6 % in mixture either with sodium chlorate 6 % or dalapon 6 % gave the best results, though the diuron + sodium chlorate was preferable. Perennial weeds were not affected, but diuron gave excellent suppression of Oxalis debilis and O. latifolia, and were superior in this respect to monuron, simazine and atrazine. All herbicides gave good control of annual weeds, but diuron was superior in this case also, especially with Digitaria timorensis, Setaria pallidefusca, S. barbata, Pycreus ferruginens, Oxalis repens, Lobelia cliffortiana, Ageratum conyzoides and Crepis japonica. The following annuals appeared to be resistant to all herbicides: Argemone mexicana, Plantago lanceolata and to a lesser extent, Paspalum paniculatum. Transfer of interline plant residues from one line to another so as to enable the soil on which they lay to be sprayed gave excellent results and was a practice to be recommended in all wet localities of Mauritius.

2. Effect of substituted ureas, triazine compounds and TCA on cane growth. Monuron, diuron, simazine and atrazine, each at 5 %, were applied just after planting, 10 days later, or 4 weeks later. TCA at 10 % was applied after planting only. In no case was there any significant effect on germination, cane growth or tiller production.

3. Effect of TCA and dalapon on cane yield. TCA at 100, 150 or 200 % was applied at 1 or 2 months after planting, or to plant canes 7 months old, dalapon at 20,

40 or 80 # was applied at 1 or 2 months after planting and rates of 10, 15 or 20 # were applied to plant canes 7 months old. No significant differences in cane yield were noted for any treatment, though there were indications that TCA at 20 # and dalapon at 20 # had adversely affected cane growth, and all rates of dalapon (but none of TCA) caused tiller malformations in plant canes.

4. Evaluating new herbicides with the Chesterford logarithmic sprayer. Of a number of proprietary herbicides tested, diuron, on a lb/lb active basis, gave the best results.

5. Further studies on Cynodon dactylon biotypes. In Mauritius two tetraploid and two triploid biotypes of C. dactylon have been found. These biotypes differed in epidermal structure. In glasshouse tests to determine the reaction of different biotypes to dalapon and TCA, the tetraploids were in general, more resistant to both herbicides than the triploids. TCA appeared to enter the plants through the leaves as well as the roots. - P.J.B. [O.W.]

862. KAVANAGH, K.F. Progress in weed control in Malaya. World Crops, 1961, 13 (6), 217-20.

Reviews the use of herbicides (mainly simazine) in rubber (Hevea brasiliensis) in Malaya (see Weed Abstr. 10, 863). Immature oil palm (Elaeis sp.) and basket seedlings have tolerated simazine at rates up to 30 #. In oil palm simazine can be used for controlling weeds when establishing leguminous ground covers by applying it to the soil at 3.75 # outside the seed rows immediately the seedlings are visible, and then applying it again at 3.75 # 12 weeks later. It is recommended that simazine be used at 3.75 # for preventing weed growth for 12-15 weeks in clean weeded circles around the oil palms. P.J.B. [O.W.]

863. WRIGLEY, G., FLETCHER, M.A., PFEIFFER, R.A. and CHILDWELL, E.D. (Fisons Pest Control, Ltd., Chesterford Park Res.Sta., Saffron Walden, Essex, England). The possibilities for pre-emergence weed-killers in immature rubber. Proc.Natural Rubber Res.Conf., 1960, 290-5, bibl.4.

In trials in 1959, simazine 5, 10 and 15 # was applied to freshly weeded rows of rubber trees and assessments of weed control made over a 5-month period. Simazine controlled all important grass and broad-leaved weeds, including Paspalum conjugatum. Recolonization, especially with Axonopus compressus and P. conjugatum, was rapid as soon as the simazine had broken down in the soil, but Imperata cylindrica did not recur. Simazine at 5 and 10 # did not give weed control of sufficient duration to compete with hand weeding; 15 # gave control for 5-6 months at most locations. Leguminous cover crops planted between rows of young rubber trees took root in soil treated with all rates of simazine used. It appeared to be inadvisable to spray basket seedlings and newly planted seedlings until they had been in the ground for at least 4 months and to prevent damage, it was necessary to leave the soil within a distance of 6 in. from each trunk unsprayed. Residues of simazine remaining in soils in the field after periods up to 8 months had elapsed between application and sampling were very small in nearly all cases. - P.J.B. [O.RE.]

864. BAGLEY, W.A. and MIYOSHI, R.T. Chemical weed control in windbarriers. Tree Planters' Notes, 1960, 40, 13-15.

In trials at different locations in Nebraska in 1959, new plantings and 1- and 2-year-old established plantings of tree species were treated with diuron 4 #, simazine 4 # and atrazine 2 # in the third week in May. Weed control with all 3 herbicides was adequate at all locations. Weedy grasses, including Echinochloa crus-galli, Setaria sp. and Digitaria sanguinalis, encroached on the plots in late July and early August where simazine and atrazine had been used; encroachment where diuron had been used was not so great. Trees 1 and 2 years old were not injured, except at one location on sandy-loam soil. Trees planted in 1959 were not seriously injured except by diuron at 2 locations where seasonal rainfall was high and rainfall in June amounted to 5 in. Atrazine caused heavy mortality in Lonicera tatarica. From the evidence of control plots weed competition in most cases was more deleterious than herbicidal treatment. The use of herbicides also obviated tree losses caused by the use of cultivation treatment and conserved soil moisture, a factor of great importance under Great Plains conditions. P.J.B. (17(7C.2))

865. BRUN, W.A., CRUZADO, H.J. and LULLK, T.J. (Fed.Exp.Sta., U.S.Dep.Agric., Mayaguez, Puerto Rico, South America.) The chemical defoliation and desiccation of tropical woody plants. Trop.Agric.Trin., 1961, 38, (1), 69-81, figs.1, tabs.2, bibl.3.

In trials in which 51 different formulations of compounds (including 2,4,5-T, 2,4-D, TCA, aromatic oils, PCP, AMS, amitrole, endothal, potassium cyanate, and sodium chlorates and borates), alone, and/or in mixtures, were tested on 25 spp., the most effective defoliants were those containing butyne

1,4-diol, tributyl phosphorotrithioite, or mixtures of these, the mixtures being more effective than either compound alone. The conventional type growth regulators, e.g. 2,4,5-T, were much less effective and sometimes completely without effect. Of 13 formulations showing desiccating activity, tributyl phosphate was clearly the most effective. The primary path of entry of both defoliators and desiccators was through the stomatal openings. Rain falling 5 minutes after application did not reduce the effect of tributyl phosphate. From Author's Summary modified. - D.M.L.S. [O.RE.]

BIOLOGY OF WEEDS AND POISONING BY WEEDS

866. WILSON, F. (Div.Entomol.,C.S.I.R.O., Canberra, Australia). A review of the biological control of insects and weeds in Australia and Australian New Guinea. Tech. Comm.Commonw.Inst.Biol.Control,Ottawa, 1960, 1,pp.102, bibl.558.

The biological control of the following weeds is reviewed: Opuntia spp., Hypericum perforatum, Lantana camara, Eupatorium adenophorum, E.riparium, Ulex europaeus, Xanthium pungens, X. spinosum, Senecio jacobaea, Cyperus rotundus, Melilotopium europaeum and Chondrilla juncea. - P.J.B. [O.W.]

867. PIETO, J.H. and STANIFORTH, D.W. (Iowa Agric.Exp.Sta.,Ames,U.S.A.). Corn-foxtail competition under various production conditions. Agron.J. 1961, 53,(1),1-5, figs.3,tabs.4,bibl.9.

In studies during 2 years at 2 locations in Iowa, maize was grown to maturity in combination with different levels of infestation by foxtail (Setaria lutescens and S. viridis). The maize was either grown to maturity with the weeds, or the weeds were removed in early July. Other variables included 4 different plant populations of maize and 3 levels of nitrogen treatment. In both years, mean maize grain yield reductions resulting from mature infestations of foxtail were 20, 14 and 10 bushels/ac, respectively, where 0, 70 and 140 lb N, together with an overall application of 300 lb 0-20-20 (NPK) fertilizer was applied. The yield response of foxtail-infested maize to nitrogen was much greater than that of weed-free maize, or of foxtail grown by itself. The growth and yield (dry matter) of foxtail was severely reduced by high maize plant populations. The relationships between maize and foxtail growth were conditioned not only by individual factors of soil nitrogen, moisture, maize plant populations and level of foxtail infestation but by interaction between all 4 factors. In general, however, soil nitrogen and moisture exercised most effect on the inter-relation between maize and foxtail. It was concluded that in Iowa conditions, where soils are low in nitrogen and have only nominal infestations of foxtail, it is likely to be more profitable to apply nitrogen than herbicides. - P.J.B. [O.W.]

868. EVANS, R.A. (Nevada Agric.Exp.Sta., Reno, U.S.A.). Effects of different densities of downy brome (Bromus tectorum) on growth and survival of crested wheatgrass (Agropyron desertorum) in the greenhouse. Weeds, 1961, 9,(2),216-23, figs.5, tabs.1,bibl.7.

Glasshouse studies were carried out using soil columns 3 ft high on which were sown Agropyron desertorum seeds in a single row at 2 live seeds/in. of row, to give an average of 10 seedlings/row. At the same time, seed of Bromus tectorum was sown to give 4, 16, 64 or 256 plants/ft^2. Moisture was provided until the seedlings were established, after which it was withheld. From the 5th to the 8th week of growth, shoot growth of A. desertorum was markedly reduced when grown with 64 and 256 plants of B. tectorum/ft^2; 16 B. tectorum plants/ft^2 prevented accelerated shoot growth from the 8th week onwards, while 4/ft^2 had no apparent effect. When grown with 256, 64, 16, 4 and 0 B. tectorum plants/ft^2, growth of A. desertorum ceased after 8, 9, 11, 11 and 13 weeks, respectively. Survival of A. desertorum was markedly reduced by increasing B. tectorum populations from 16 to 64/ft^2. Light reduction caused by the early formation of a closed canopy by B. tectorum was an important factor in reducing A. desertorum growth in its early stages, while at later stages, depletion of soil moisture was important. - P.J.B. [O.W.]

869. LEE, J.A. (N.Carolina State Coll., Raleigh,U.S.A.). A study of plant competition in relation to development. Evolution, 1960, 14,(1),13-29.

A study was made of the growth of 2 barley varieties - Atlas 46 and Vaughan (good and bad competitors, respectively) in pure stands and in mixtures of the two and their root development in relation to competition. - D.M.L.S. [40(75.6)]

870. RODOCKER, W.C. (Nevada Agric.Exp. Sta.,Reno,U.S.A.). The influence of perennial vegetation and precipitation on

occurrence of Halogeton glomeratus and Bromus tectorum in arid and semi-arid regions. J.Range Mgmt, 1961, 14, (1) 28-34, figs.3, tabs.7, bibl.12.
Data are given of the occurrence of Bromus tectorum and Halogeton glomeratus in the following 6 types of perennial vegetation in N. Nevada: Artemisia tridentata, Agropyron desertorum Eurotia lanata, Atriplex nuttallii, A. confertifolia and A. confertifolia/Sarcobatus baileyi. Halogeton glomeratus showed significant increases in numbers in Agropyron cristatum sites and highly significant increases in Eurotia lanata and Atriplex nuttallii sites from 1956 to 1957. B. tectorum showed highly significant increases in Agropyron desertorum and Artemisia tridentata. There was strong evidence that neither the average frequency of perennial vegetation in arid and semi-arid regions of the West as represented by this study, nor total precipitation during late autumn, winter and spring, could account for variations in stands of early- and late-maturing annual plants as exemplified by B. tectorum and H. glomeratus. From Author's Summary. P.J.B. [O.W.]

871. NAVEH, Z. (Neve-Yaar Agric.Exp. Sta., Israel). Toxic effects of Adenostoma fasciculatum (chamise) in the Californian chaparral. Bull.Res.Coun.Israel(D), 1961, 9, (4), 190. [Abstract].
Climax communities of the Californian chaparral dominated by chamise are notable for the complete absence of a grass understorey beneath the chamise. Tests with Bromus mollis indicated that the leaves and roots of chamise contained a phytotoxic substance which inhibited seed germination and plant growth except at low concentrations, at which it acted as a growth stimulant. The substance was soluble in water and ethanol and non heat-stable. The possible effect of this substance on the soil microflora and the ecosystem as a whole is discussed. - P.J.B.

872. WAGNER, W.H. (Ann Arbor, Michigan, U.S.A.). An annotated bibliography of ragweed (Ambrosia). Rev.Allergy and appl. Immunol., 1959, 13, 353-403. [83(77.4)]

873. WAGNER, W.H. Ragweeds. Cranbrook Inst.Sci.News Let., 1960, 30, (1), 2-8, figs.4.
Brief descriptions are given of Ambrosia artemisiifolia, A. trifida and A. coronopifolia, as found in the Great Lakes region of the U.S.A. - P.J.B.

874. WAGNER, W.H. The hybrid ragweed, Ambrosia artemisiifolia x trifida. Rhodora, 1958, 60, (720), 309-13, figs.2, bibl.10.
A description is given of a rare hybrid A. artemisiifolia x A. trifida, first noted in Iowa in 1914. - P.J.B. [84(77.4)]

875. WAGNER, W.H. and BEALS, T.F. Perennial ragweeds (Ambrosia) in Michigan, with the description of a new, intermediate taxon. Rhodora, 1958, 60, (715), 177-204, figs.5, tabs. 1, bibl.27.
The distribution of Artemisia coronopifolia in Michigan is reviewed, together with its morphological characteristics and those of a hitherto undescribed perennial ragweed, which is interpreted as a natural hybrid between A. coronopifolia and A. artemisiifolia. P.J.B. [85(77.4)]

876. CIFERRI, R. Fitosociologia delle malerbe delle risaie italiane e iberiche. (Phytosociology of weeds of Italian and Iberian rice fields). Riso, 1960, 9, (7), 10-11, (It.).
The various plant associations found in studies of Italian, Spanish, Portuguese and French ricefields are reviewed and compared. D.M.L.S. [G.R.I.]

877. BHARUCHA, F.R. and MANNIK, C.R. Ecological studies of the weed flora of the ricefields of Bombay and Salsette Islands. J.Biol.Sci., 1960, 3, (1), 30-7.
Includes a comparison of plant succession in salty and non-salty soils. D.M.L.S.

878. HSI, YU-TSENG. (Univ.Minnesota, U.S.A.). Taxonomy, distribution and relationships of the species of Cirsium belonging to the series Undulata. Ph.D. Thesis, Univ.Minnesota, 1960, pp.91, Microfilm $2.75, Xerox $4.80.
Experiments showed Cirsium flodmanii, C. canescens, C. pitcheri and C. undulatum all to be self-fertile. Chromosome numbers of the following 8 species are given (the basic numbers of the series are 11, 12, 13, 15, 16, and 17); C. undulatum 2N = 26, C. canescens 2N = 34-35, C. flodmanii 2N = 22, C. pitcheri 2N = 34, C. tracyi 2N = 24, C. brevifolium 2N = 22, C. macrocarpum 2N = 32 and C. ochrocentrum 2N = 32. No polyploidy was found in this series.

Two species groups were observed, Group I having 32-34(-35) somatic chromosomes and all having decurrent leaves, and Group II having 22-32 somatic chromosomes and nearly all with non-decurrent leaves. Groups I and II are linked by transitional forms represented by C. macrocarpum.
In addition to the species already mentioned, the following species are described; C. undulatum var. undulatum, C. undulatum var. townsendii, C. undulatum var. angustifolium, C. wheeleri, C. durangense, C. canovirens and C. velatum. From Diss.Abstr. 21,(8),2085. J.W.F.

879. PRITCHARD, T. (Nature Conserv., 19 Belgrave Square,London,S.W.1). Cytotaxonomy and ecology of the weedy species Euphorbia cyparissias L. and Euphorbia esula L. Proc.9th internat.Bot.Congr., 1959, 2,311. [Abstract].
The different forms of E. cyparissias and E. esula and their ability to hybridize are discussed. - D.M.L.S. [O.BO.]

880. SHEA, K.R. (Weyerhaeuser Timber Co., Centralia,U.S.A.). Dwarf mistletoe of ponderosa pine. Present status and future weeds. Proc.9th internat.Bot.Congr., 1959, 2,358.[Abstract].
Pinus ponderosa is commonly parasitized by two species of dwarf mistletoe - Arceuthobium vaginatum f. cryptopodum in the south western States of the U.S.A. and A. campylopodum f. typicum in western N. America. The need for much wider fundamental research on the ecology, biology and physiology of the parasites and their host is urged. - D.M.L.S. [O.BO.]

881. HAWKESWORTH, F.G. (U.S.For.Ser., Fort Collins,U.S.A.). Dwarf mistletoe of Ponderosa pine. Proc.9th internat.Bot.Congr. 1959, 2,154. [Abstract].
The paper deals primarily with the ecological relationship of Arceuthobium vaginatum f. cryptopodum to its host. In natural stands, severe forest fires are of major importance in limiting distribution; heavy logging may also control the spread, but partial cuttings usually stimulate parasitism in the residual pines. In the southwest, there is little or no relation between site quality and prevalence. Information from one area in S. New Mexico shows that frequency of A. vaginatum is highest on South and southwest exposures and least on the northwest, it is slightly higher on gentle than on steep slopes, most common on ridges, less common on side hills, and least common in bottoms. It is also highest at medial altitudes of the host range and decreases towards the upper and lower limits. From Author's Summary modified. - D.M.L.S. [O.BO]

882. KUIJT, J. Patterns of shoot emergence in Arceuthobium. Proc.9th internat.Bot.Congr. 1959, 2,208-9. [Abstract].
When A. americanum, A. douglasii, A. pusillum, and A. minutissimum attack certain hosts, their shoots emerge in predetermined patterns from the host branches. Such regularity is always associated with brooming phenomena of the host. In A. americanum and A. douglasii the endophytic system is present even in the short apex of the host, thus keeping pace with host elongation. The same phenomenon is inferred for A. pusillum and A. minutissimum. Other spp. of Arceuthobium, though probably able to induce brooms, do not appear to show regular shoot emergence patterns; it is inferred that in these spp. the endophytic system does not reach the host apex. Likewise in Pilostyles hausknechtii a regular pattern of emergence coincides with a penetration of the endophytic system into the shoot apex of the host. From Author's Summary modified. D.M.L.S. [O.BO]

883. * MULVEY, R.H. (Ent.Lab.,Ottawa, Canada). Susceptibilities of cultivated and weed plants to the sugar-beet nematode Heterodera schachtii Schmidt, 1871, in southwestern Ontario. J. Helminthol., 1957, 31,(4),225-8.

884. GIBBS, A.J. (Rothamsted Exp.Sta., Harpenden,Herts.) Studies on the importance of wild beet as a source of pathogens for the sugar beet crop. Ann. appl.Biol., 1960, 48,(4),771-9.
There was no evidence that beet yellows spread in East Anglia from wild beet (Beta vulgaris ssp. maritima) to nearby sugar beet crops during the springs of 1958 or 1959, and Myzus persicae was rarely found on wild beet growing on the foreshore.
In glasshouse experiments, aphids colonized sugar beet plants watered with tap water or distilled water in preference to those watered with sea water. Daily watering with sea-water made plants unpalatable to aphids within 14 days. From Author's Summary modified. D.M.L.S. [O.RE.]

885. JAIN, H.K. and BHATTACHARYA, A.K. Chemical constituents of some local weeds. I. Humification of arousa (Justicia adhatoda) leaves under constant moisture level and variations in the amounts of carbohydrates. Z.PflErnährDüng., 1960, 91,233-40.
Since mineral N in the soil increases on humification of arousa, this plant is a potential green manure, although non-leguminous. The decomposition of the leaves occurs with the preferential oxidation of carbon compared with that of N. Abstr.J.Sci.Fd.Agric., 12,i-211.

886. BASSETT, I.J. and FRANKTON, G. (Plant Res.Inst. Res.Br. Canada Dep.Agric., Cent.Exp.Fm,Ottawa,Ontario). Canadian havens from hay fever 1961. Publ.Canad. Govt.Travel Bur. [n.d.], pp.27.
The biology of pollens which cause hay fever is reviewed briefly and descriptions are given of the ragweed species Ambrosia artemisiifolia var. elatior, A. trifida and A. psilostachya var. coronopifolia, together with notes on the distribution of ragweeds in the different provinces of Canada. - P.J.B. [250(71)]

887. OLDRIGHS, P.B. and McEWAN, T. (Anim.Res.Inst., Dep.Agric.and Stock, Brisbane,Australia). Isolation of the toxic principle in Acacia georginae. Nature, 1961, 190,(4778),808-9.
The toxic principle in the seeds of A. georginae has been identified as the fluoroacetate ion. In tests with laboratory animals and sheep, amounts of potassium fluoroacetate similar to those found in seeds of A. georginae have caused symptoms of toxicity identical to those where A. georginae has been fed. This species is widely distributed in N.W. Queensland and adjacent parts of the Northern Territories, where serious losses of livestock have been caused apparently by the consumption of natural forages. - P.J.B. [O.W.]

888. SMITH, H.A. The diagnosis of oak poisoning [Quercus havardii]. Sthwest Vet. 1959, 13,34-6.
In cattle. Post-mortem findings are given. From Vet.Bull., Weybridge 30 (8), 468.

AQUATIC AND WOODY WEEDS AND THEIR CONTROL

889. TIMMONS, F.L. and KLINGMAN, D.L. (Univ.Wyoming,Laramie(F.L.T.) Weed Invest., Grazing Lands,Agric.and Res.Serv.,U.S.Dep. Agric.,Beltsville,Maryland (D.L.K.). Control of aquatic and bank vegetation and phreatophytes. Symp.Water and Agriculture,Amer. Assoc.Adv.Sci., 1960, 157-70, bibl.31.
Ways in which ditchbank and aquatic weeds and phreatophytes cause economic losses and the cost of such losses are discussed briefly. Methods now in use for controlling aquatic and ditchbank weeds are reviewed. A special section is devoted to the problem of phreatophytes, with particular reference to salt cedar (Tamarix pentandra). For control of T. pentandra, the most effective and least expensive procedure in most river flood plains and reservoir sites is first to clear mature growth by mechanical means, burn the debris and then control regrowth when 4-6 months old with a 50-50 mixture of 2,4-D + 2,4,5-T esters at 2.5 lb (or more), with follow-up treatments repeated once or twice/ year during the following years. Dormant season application of 2,4-D and 2,4,5-T esters, in oil or oil-water emulsion, is effective for controlling scattered infestations, but is otherwise expensive. 2,4,5-TP is reported to be more effective than 2,4,-D or 2,4,5-T against this species. - P.J.B. [22(78.7)]

890. PEARCE, G.A. (Dep.Agric.,St.George's Terrace,Perth,W.Australia). Weed research. 6. Weed control in channels. J.Agric.W. Aust., 1959, 8,(6),729-34,(illus.), bibl.1.
Brief general information is given on the use of dalapon, amitrole, 2,4-D, and monuron and the following recommendations are included:- cumbungi or yanget [Typha sp.], 2,4-D (ester) 3 lb in 200 gal water applied to regrowth (after cutting or burning) 3-6 ft high during summer; for Cyperus eragrostis 2,4-D (oil-based ester) 4 lb + emulsifier and wetting agent in 150 gal water shortly before flowering; for cultivation rush [Juncus polyanthemus], 2,4-D (ester) 3 lb in 200 gal water; for J. pauciflorus, 2,4-D (ester) 6 lb in 200 gal water; for Paspalum distichum monuron 50 lb in 200 gal water after removal of top growth. - D.M.L.S. [O.W.]

891. ITALY, SOCIETA ITALIANA DI FITOIATRIA, PAVIA. Il diserbo dei canali. [Weed control in canals]. Man. fitoiatria, Soc. it. Fitoiatr. Pavia, 1961, 6, pp.31, (It.).
The use of various herbicides is very briefly reviewed. Good results against Carex pendula and Juncus articulatus have been obtained with 2,4 D (heavy esters) + amitrole (either mixed, or better still with a month's interval between treatments). Amitrole at 10 kg/ha controls Carex riparia and at 20 kg/ha Paspalum dilatatum. - D.L.L.S. [73(45)]

892. MASON, R. (Bot. Div., D.S.I.R., Christchurch, New Zealand). Three waterweeds of the family Hydrocharitaceae in New Zealand. N.Z. J.Sci., 1960, 3, (3), 382-95, bibl. 15.
Descriptions, with key, are given for two new species adventive to New Zealand, Lagarosiphon major and Egeria densa, and of the long-established Elodea canadensis. It is considered that E. canadensis has probably reached nearly all waters in New Zealand to which it is suited. E. densa and L. major (from S. America and Africa, respectively) are thought likely, at present, to be in the phase of vigorous growth and rapid spread noted in certain weeds during naturalization. The 3 species are able to grow together. E. canadensis is adapted to slightly cooler waters than the other two species and the ultimate distribution of the three species is unlikely to be the same. - P.J.B. [55(931)]

893. GORHAM, P.R., SILPSON, D., BISHOP, C.T. and ANET, E.F.L.J. (Nat. Res. Council, Ottawa, Canada). Toxic waterblooms of blue-green algae. Proc. 9th Internat. Bot. Congr., 1959, 2, 137. [Abstract].
Unialgal cultures of several strains of planktonic blue-green algae were found to vary greatly in toxicity. Two toxic factors, one algal and the other bacterial in origin, were recognized; their principles are examined. D.L.L.S. [O.BO.]

894. DARROW, R.A. (Texas A. and M. Coll. College Station, U.S.A.). Aerial application of phytocides for woody plant control on range and forest lands. Proc. 9th Internat. Bot. Congr., 1959, 2, 96-7. [Abstract].
A review with special reference to range improvement. - D.L.L.S. [O.BO.]

895. * HINSCHEL, D.G. Tests of some chemical herbicides in controlling brush, weed trees, and grasses on the McDonald Forest. For. Thesis, Oregon State Coll., 1956.

896. HØIL, K.L. Kjemisk bekjempelse av treaktig vegetasjon ved hjelp av basalsprøytning eller stubbebehandling. [Chemical control of woody vegetation with the help of basal-bark spraying or stump treatment. Norsk Skogbruk, 1961, (1), pp.4 (Nor.).
Recommendations are given for the use of 2,4,5-T ester as a basal-bark spray and stump treatment for controlling woody species, together with brief notes on the application of the two methods. - P.J.B. [56(481)]

897. STARR, J.W. The use of an injector for control of individual weed trees. Hormolog 1961, 3, (1), 14-15, figs.2, tabs.3.
The results are given of trials in Mississippi to determine the best herbicide, concentration of herbicide and carrier to use with tree injectors. The following herbicides were injected in June: (a) 2,4,5-T butoxyethanol ester (non-emulsifiable) 4 lb/gal, (b) butoxyethanol esters of 2,4-D + 2,4,5-T (non-emulsifiable) 2 lb of each/gal, (c) 2,4,5-T triethylamine salt 4 lb/gal, (d) triethylamine salts of 2,4-D + 2,4,5-T 2 lb of each/gal, (e) 2,4,5-T butoxyethanol ester (emulsifiable) 4 lb/gal and (f) 2,4,5-T acid (emulsifiable) 2 lb/gal. In all cases, the herbicides were applied as 5 and 10% solutions by volume (20 and 40 lb a.e./100 gal). At the end of the second season after treatment, all treatments except the 20 lb rate of (e) gave good control, ranging from 99% for the 40 lb rate of (a) to 89% for the 20 lb rate of (f). Increasing the concentration from 20 to 40 lb/100 gal did not significantly increase kill. Quercus rubra and Carya sp. appeared rather more difficult to kill than Q. stellata and Liquidambar styraciflua. It was concluded that oil was better than water as a carrier for 2,4,5-T esters. - P.J.B. [O.W.]

898. LITTLE, S. (Northeastern Forest Exp. Sta. New Lisbon, New Jersey U.S.A.). Recent results of tests in controlling Japanese honeysuckle. Hormolog 1961, 3, (1), 8-10, figs.4, bibl.6.
In trials in Maryland and New Jersey best control of Lonicera japonica in woodlands was given by 2,4-D 8% in 250 gal water, though one spray/year in June during 3 or more successive years was required where older formulations such as the butoxyethanol ester, ethyl ester or isopropyl ester were used. Where an emulsifiable acid formulation of 2,4-D was used at 8% in 100 gal water, full control was achieved in many cases within 2 years. Amitrole and

amitrol T (amitrole + NH_4SCN) were also relatively effective, but fenac, 2,3,6-TBA and fenuron showed little promise. 2,4-D appeared to have the least detrimental effect on seedlings of desirable tree species among the herbicides tested. The need for continued control of L. japonica seedlings is stressed. - P.J.B. [O.W.]

899. VLAMIS, J. and GOWANS, K.D. (Dep. Soils and Plant.Nutrit., Univ.California, Davis, U.S.A.). Availability of nitrogen, phosphorus and sulphur after brush burning. J.Range Mgmt, 1961, 14, (1), 38-40, figs.1, tabs.1, bibl.7.

The results of studies of Parrish loam soils derived from unburned areas and from areas on which dense stands of Adenostoma fasciculatum and Ceanothus cuneatus had been burned indicated that burning increased the supply of available nitrogen, phosphorus and sulphur. - P.J.B. [O.W.]

OTHER WEEDS AND THEIR CONTROL

900. O'CONNOR, B.A. (Agric.Sta., Koronivia, Fiji.) A decade of biological control work in Fiji. Agric.J.Fiji, 1960, 30, (2), 44-54, figs.8, tabs.2, bibl.8.

Included are notes on attempts at the biological control of Xanthium pungens, Lantana camara, and Elephantopus mollis by means of various insects. The seed-fly imported from Queensland to control X. pungens failed to become established. The leaf rolling moth, Syngamia haemorrhoidalis, imported in 1958 and 1959 for the control of L. camara appears to be well established and so also is the seed-fly, Tetracnaresta obscuriventris, obtained from Trinidad for the control of E. mollis. The effects have not yet been assessed. - D.M.L.S. [O.RE.]

901. FRIESEN, H.A. (Exptl Fm, Lacombe, Alberta, Canada. Some factors affecting the control of wild oats with barban. Weeds, 1961, 9, (2), 185-94, tabs.7, bibl.10.

In glasshouse experiments, barley and wild oats were sown separately and treated when at the 1.5 leaf stage with barban at 0.25, 0.5 or 1 % in water at either 6.5 or 56 gal/ac. All treatments suppressed the growth of both barley and wild oats. Increasing the spray volume from 6.5 to 56 gal reduced the growth-inhibiting effect of the 0.5 and 1 % rates on wild oats to some extent, but greatly reduced the effect of these rates on barley. There was little differential suppression of wild oats between the two spray volumes used with the 0.25 % rate. It is suggested that spray pattern may have influenced these results. In further experiments using a cone or a double fan nozzle (30 p.s.i.) resulted in greater inhibition of wild oats than did a single fan where rates of 0.125 and 0.25 % were applied; with a rate of 0.5 % these differences disappear. These results were not borne out in field trials. Mixtures of barban + 2,4-D butyl ester, each at 0.25 %, or barban + MCPA amine or + barban MCPB were all less effective against wild oats than barban alone.

In field trials, during 1959 and 1960, wild oats in wheat were treated with barban at 0.25, 0.5 or 1 % at growth stages ranging from the 1.5-2 leaf to 3.5-4 leaf stages. The greatest reduction in growth and plant numbers followed spraying at the 1.5-2 leaf stage. Reduction in numbers where 0.5 and 1 % was applied in 6.5 gal spray at the 1.5-3 leaf stage was nearly 40% in 1959 and 50% in 1960. Growth suppression took the form of reduction in tiller numbers, reduced plant height and tiller development. Surviving plants resumed growth within about 4 weeks after treatment. In 1959, increasing the spray volume from 6 to 30 gal/ac significantly reduced herbicidal effectiveness. Significant increases in wheat yield occurred in 1959 only, where barban was applied at the 1.5-3 leaf stage of the wild oats with the low spray volume. The 1 % rate injured the wheat, but this was more than offset by the control of wild oats secured. Matured wild oat seeds produced by plants treated with barban were viable. There were varietal differences in wheat, barley and flax in reaction to barban. - P.J.B. [O.W.]

902. GUSTAFSSON, H. Skärpta bestämmelser mot flyghavren. [More stringent regulations for the control of wild oats]. Hushålln. Sällsk.Tidskr., 1960, 27, (6), 125-6.

Among contemplated changes in the existing regulations is the rescinding of that which permits fodder grain to contain 5 grains (seeds) of wild oats per kg. Field Crop Abstr., 14, 906.

903. NORWAY, NORDISKE JORDBRUGSFORSKNING Resultater av nordiske fellesplaner for bekjempelse av kvelle (Agropyron repens P.B.). [Results of the associated Scandinavian plan

for the control of Agropyron repens]. Nord. JordbrForskn., 1960, Suppl. 1, 132-3.

Sweden. TCA at 25 kg/ha gave satisfactory control of Agropyron repens. Late autumn applications gave very good results in areas such as Norrland, where the frosts begin relatively early in autumn and little leaching occurs during winter, but in S. and central Sweden treatment in spring gave better results. Cultivating after treatment gave increased weed control. Cruciferous crops were resistant to TCA. Potatoes could not safely be grown directly after treatment in areas with low spring rainfall. Peas withstood up to TCA 12.5 kg/ha. Cereals could not usually be grown before 1 year after treatment. Similar results were obtained where dalapon was used in place of TCA.

Finland. Best control of A. repens was achieved with early spring applications of TCA.

Denmark. TCA at 12.5, 25 and 50 kg/ha and dalapon at 12.5 and 25 kg/ha, applied in early spring 4-6 weeks before sowing swedes or planting potatoes, gave good control of A. repens. In 4 trials with swedes, increasing rates of herbicide increasingly depressed yields. Yields of potatoes in 3 trials were severely reduced. In further trials with swedes where the rate of herbicide application was reduced to 10, 15 or 20 kg TCA and 5 or 10 kg dalapon/ha, yields were increased in most cases but severely depressed in others.

Norway. In trials with swedes, turnips, fodder-sugar-beet, fodder-beet, rape, potatoes and white mustard [Sinapis alba], TCA was applied in early spring at 12.5, 25 and 50 kg/ha, and dalapon at 25 kg/ha. At harvest, the percentage of ground covered by A. repens in treated plots was 9, 5, 3 and 3%, respectively, compared with 34% in untreated plots. Where TCA was applied at 25 kg/ha, all the above crops except mustard yielded satisfactorily; among the potato varieties grown, Kerr's Pink yielded 6% more when treated, and Marius II 13% less. J/ssing potatoes were fairly resistant to TCA. - Field Crop Abstr. 14, 907.

904. HAMILTON, K.C. and DENNIS, R.E. Control field bindweed. Folder Univ.Arizona agric.exp.Sta., 1961, 68, pp.5.

For spot control of Convolvulus arvensis 2,3,6-TBA 20 % in 10-70 gal water applied when the stems are 12-24 in. long is recommended. General infestations with this weed can be reduced by applying 2,4-D 1 % to plants at the same growth stage, or, especially on high-value land the use of summer fallow. P.J.B. [22(70.1)]

905. MEADLY, G.R.W. Hoary cress (Cardaria draba (L.) Desv.). J. Agric.W.Aust., 1961, 2, (4), 353-5, figs.2.

In Australia, C. draba is commonest in Victoria. It has not yet spread to Western Australia. A description is given of C. draba and a note on its agricultural significance and control. Treatment (repeated) with 2,4-D ester applied, as far as possible, at the early flowering stage has given control of small infestations, but there is not, as yet, any effective large-scale control method. - P.J.B. [O.W.]

906. REYNOLDS, D.G. (Dep.Agric., Fairlie, New Zealand). Yarrow as a weed and seed crop. N.Z.J.Agric., 1961, 102, (3), 257-8 (illus.).

Yarrow [Achillea millefolium] is extremely palatable to stock and survives under severe grazing. On arable land good control may be obtained from thorough cultivation followed by grazing, especially by sheep which eat the exposed roots. The establishment of a dense cover of autumn-sown cereal for feeding green, followed by further cultivation and grazing, should kill 95% of the weed. Any regrowth should be spot-sprayed with a hormone weed killer. 2,4-D (ester) 2 % is recommended, applied at flowerhead initiation, with repeat treatments where necessary. - D.M.L.S. [O.ME.]

907. UNITED STATES, KENTUCKY AGRICULTURAL EXPERIMENT STATION. Johnson grass control. A farm and county program. Progr.Rep.Ky agric.exp.Sta., 1959, 78, pp.16 (illus.) figs.3, tabs.3.

Three applications at 7-day intervals of dalapon (sodium) 5 % applied in late August and September reduced Sorghum halepense rootstock plants by ca 95% and was slightly, but not significantly, more effective than 1 application of 30 % or a 9:1 mixture of kerosene and hexachloroacetone and significantly more effective than TCA (sodium) 40 or 80 %, which gave only a 70% reduction. In the following year the number of seedling plants was much greater on the plots where the herbicidal treatments had controlled the rootstock plants than on the untreated plots. Disking at 2-3 week intervals from June 25 until the autumn was more effective (and less expensive) for controlling seedling plants than 3 applications of dalapon 7.5 + 5 + 5 % at monthly intervals.

In a trial to control S. halepense before sowing maize, spraying with dalapon 15 %

on new foliage 1 week before ploughing, and disking 3 weeks later just before sowing, resulted in ca 93% reduction of S. halepense stems and was more effective than 2 ploughings alternating with diskings and much more effective than 1 ploughing and 1 disking just before sowing; no injury was caused to the maize, but the method necessitated late sowing. Sowing on the square, followed by frequent cross cultivation is a good method of controlling S. halepense in maize fields where root-stocks have been largely eliminated.

Of various directed spot treatments applied 3 times at 9-day intervals to the lower parts of S. halepense plants growing in drilled maize, kerosene mixed with C-56 [hexachlorocyclopentadiene] in ratios of 100:1 and 100:0.5 gave ca 95% reduction of stems without serious injury to the maize and was more effective than kerosene alone or dalapon 1 lb/5 gal water. When the dalapon was applied as a foliage spray, maize ears and stalks were injured. EPTC 3 and 6 ℔ applied pre-planting and incorporated, reduced seedling plants by 92 and 96% respectively.

The recommendations given for solid infestations is as follows: 1st year - dalapon 7.5 ℔ in 20 gal water applied to plants 9-15 in. high or to regrowth (after mowing) at boot stage, with repeat 7-10 days later; break land 1-3 weeks after 2nd application and clean cultivate until time to sow small grain; 2nd year - break or disk land heavily after small grain and not later than boot stage of S. halepense root stock plants or 7-leaf stage of seedlings and clean cultivate every 2-3 weeks until time to sow small grain. The recommendations for spot treatments are sodium chlorate 1-1.5 lb/100 ft^2 or TCA 4-6 oz/100 ft^2 applied to early growth, or dalapon 1 oz/gal water/100 ft^2 applied when 9-15 in. high with 2 repeats at 6-weekly intervals. - D.H.L.S. [18(76.9)]

908. FRANS, R.E. Controlling johnsongrass by fallowing and cropping systems. Arkansas Fm Res., 1960, 9,(6),2, figs.1, tabs.1.

In studies at Fayetteville, Arkansas, plots were uniformly sown to Sorghum halepense and subjected to different fallowing and crop rotation treatments, using wheat, lucerne or cotton. Fallowing before establishing a cropping system reduced stem numbers of S. halepense by an average of 60%. Imposing cropping systems, in itself, reduced stem numbers significantly compared with non-tilled controls, but there were no significant differences between cropping systems. Prior fallowing reduced stem numbers to very low levels on plots sown to wheat or cotton, but not on those sown to lucerne. A clean-cultivated crop such as cotton, where it followed a season of fallow, appeared to be as effective in reducing S. halepense as where a cereal crop was interposed between the fallow and the clean-cultivated crop. It was considered that prior fallowing would reduce S. halepense infestations to levels at which they could be easily dealt with by hand or herbicides. P.J.B. (31(76.7)]

909. UNITED STATES, AGRICULTURAL RESEARCH. New herbicide controls barnyard grass. Agric.Res., 1961, 9,(7),5, figs.1.

In glasshouse trials, 3,4-dichloropropionanilide controlled Echinochloa crusgalli in rice without causing crop injury, even when applied at 16 ℔ (normal rate 4 ℔). Best control of E. crusgalli was secured by treating it when at the 2-3-leaf stage. In field trials, post-em. treatment with 1, 2 and 4 ℔ gave 75, 80 and 90% control respectively. No special sowing or water management practices are required with this herbicide. It is effective for 3-4 weeks only. Adding chlorpropham or amiben at one-third the rates normally used prolonged the residual effect of 3,4-dichloropropionanilide. P.J.B. [O.W.]

910. UNITED STATES, AGRICULTURAL RESEARCH. After Klamath weed, what? Agric.Res., 1961, 9,(7),6, figs. 1.

Areas in the U.S.A. from which Hypericum perforatum has been removed by Chrysolina gerellata and C. hyperica, have, in some cases, been invaded by Linaria dalmatica. In studies in Washington, L. dalmatica showed poor ability to compete with heavy stands of competing grasses into which it was sown at the same time as the grasses were sown. - P.J.B. [O.W.]

911. STEYTLER, R. van R. Beware of weeds in the veld. Fmg S. Afr., 1960, 36,(6), 22-6, figs. 4.

The following 5 proclaimed weeds are described and control measures suggested: dodder [Cuscuta spp.], 2,4-D 2-4 lb a.e./morgen in 20 gal water, [1 morgen = 2.117 ac], burning dried plant trash over the infested area, or ploughing before sowing maize or millet for a few years to enable 2,4-D to be

used; spear or bull thistle [Cirsium vulgare?] hoeing, burning, or 2,4-D 4 lb a.e./morgen in 20 gal water; cocklebur [Xanthium spinosum] and upright starbur [Acanthospermum hispidum], 1 or 2 applications of 2,4-D 1.5-2.0 lb a.e./morgen in 20 gal water. - J.W.F. [G.R.I.]

912. SOUTH AFRICA, FARMING IN SOUTH AFRICA. Hardy marigolds defy weedkillers. Fmg S.Afr., 1960, 36,(6),26.
Experiments in the Highveld Region have shown that marigold (Arctotis leiocarpa) is resistant to all weedkillers, spurry (Spergula arvensis) can be temporarily controlled with MCPA 4 lb/ morgen [1 morgen = 2.117 ac], and geelblommetjie (Ursinia nana) is resistant to all weedkillers available in S.Africa, although it is suggested that mecoprop may be effective. J.W.F. [G.R.I.]

913. TIDEMAN, A.F. (Dept.of Agric. Box 901E G.P.O.,Adelaide,South Australia). Tomato weed in South Australia (Solanum elaeagnifolium Cav.). Proc.2nd Aust.Weeds Conf., 1960, 64, pp.3.
S. elaeagnifolium, a deep-rooted perennial, is distinguished from S. esuriale. In preliminary trials 2,4,5-TP has shown promise. The butoxy ethanol ester of 2,4-D gave excellent control in 1 trial, but not in a later trial in which rainfall was low. D.M.L.S. [O.W.]

914. TIDEMAN, A.F. Colocynth - a melon with a difference. J.Agric. S.Aust., 1961, 64,(7),290-2, figs.3.
Descriptions are given of colocynth [Colocynthis vulgaris] and bitter melon [Citrullus vulgaris?] to enable them to be distinguished from each other. Colocynth is reported to be spreading in certain pastoral regions of S. Australia and is also reported to be poisonous to livestock. Cultivations for the control of bitter melon are ineffective against colocynth (a perennial). Hand-grubbing, followed by burning, is, so far, the only effective means of control. Hormone sprays are ineffective against mature plants, though 0.2% solutions of 2,4-D will retard the fresh growth. - P.J.M. [O.W.]

915. HEADLY, G.R.W. (Dep.Agric.,Perth, W.Australia). Weeds of Western Australia. Soursob (Oxalis pes-caprae L.). J.Agric. W.Aust., 1960, 1,(4th Ser.) (10), 981-3 figs.2.
The weed is described and illustrated its toxicity to sheep discussed, and control measures briefly reviewed. - D.M.L.S. [O.RE.]

916. CLARKE, E.A. (Whatawhata Hill Country Sta.,New Zealand). Fern control. N.Z.J.Agric., 1960, 101,(5),449-58, figs.7.
[Adapted from paper given to the 'Ruakura Farmers' Conference]. The growth habits and reproduction methods of Pteridium esculentum are described. Sodium chlorate and arsenic pentoxide at heavy rates will kill the foliage but not the deeper rhizomes, and so far no chemical has given practicable control in New Zealand hill country. Burning in autumn or early spring, followed by sowing pasture species, top dressing and grazing is recommended as the best control method. Stock management to provide maximum grazing while fronds are young is an important factor. P. esculentum poisoning is rare in sheep and horses and uncommon in cattle.
Paesia scaberula is usually killed by burning as its rhizome is on the soil surface. Spraying with arsenic pentoxide often helps to obtain a good burn in very wet climates. Histiopteris incisa is also easily damaged by fire; it is never eaten by stock but is seldom of importance in grassland. - D.M.L.S. [O.RE.]

917. BELL, J.E. (Dep.Agric.,Auckland, New Zealand). Control of ratstail. N.Z. J.Agric., 1961, 102,(3),291-3.
Trials in 1958 and 1959 showed that dalapon 2 % will give good control of Sporobolus capensis at any season, but the rate of kill is very slow. Amitrole was effective, but slightly less dependable, and mixtures of amitrole and dalapon were no more effective. Higher rates gave a quicker kill. - D.M.L.S. [O.RE.]

918. AUSTRALIA, QUEENSLAND, DEPARTMENT OF AGRICULTURE AND STOCK. Rep. 1959-1960.
Chlorpropham and CDAA pre-em. have given the best control of black pigweed [Trianthema portulacastrum] and barnyard millet [Echinochloa sp.] to date. From Exp.Cott.Gr.Rev. 38,(2) 145. - D.M.L.S.

919. DU PONT COMPANY. (Du Pont Co. (United Kingdom)Ltd.,76 Jermyn Street London,S.W.1. Du Pont Herbicide 326. Publ.Du Pont Co., Ind. J, pp.9.

Herbicide 326 is 3-(3,4-dichlorophenyl)-1-methoxy-1-methylurea. It has a solubility in water of 75 p.p.m. at room temperature and is soluble in acetone, ethanol, benzene, toluene and xylene and has an approximate lethal dose of 1500 mg/kg (orally) to male white rats. It was non-toxic to rats at dietary levels of 80 and 400 p.p.m. in a 90-day feeding study. Herbicide 326 is formulated as a free-flowing, wettable powder containing 50% by weight of active ingredient. In maize, directed post-em. band applications when the crop was at least 12 in. tall has shown most promise; rates of 0.75-3 lb a.i. (actual area treated) in 30-60 gal spray are suggested for trial, with the higher rates used where weed stands are heavy and the organic matter content of the soil high. With cotton, rates of 0.75-2 lb a.i. (actual area treated) applied as a directed post-em. spray when the crop was about 20 in. tall has given best results. Cotton foliage is highly susceptible to injury by this herbicide. For sugar cane, it is suggested that Herbicide 326 be applied as a post-em. directed spray to both stubble and plant cane at 2-4 lb a.i. The effectiveness of pre-em treatment with Herbicide 326 has depended more on soil type than in the case of post-em. treatment. For pre-em. use on soybeans, maize and carrots, rates of 0.5 1 lb a.i. are suggested for sandy to sandy loam soils low in organic matter, up to 1.5-3 lb a.i. for silt loam to clay loam with a moderate organic matter content. The usefulness of Herbicide 326 used pre-em. on soils high in organic matter seems limited. Tolerance to pre-em. treatment has been shown in sugar cane, beans (snap, dry and lima), squash and potatoes. Injury has resulted in cucumbers, sugar beet, red beet, tomatoes, groundnuts, lucerne and red clover. For controlling winter annual weeds in established perennial plants rates of 1-3 lb a.i. are suggested. In glasshouse experiments, Herbicide 326 at 1.5-3 lb has killed or seriously weakened Agropyron repens.
P.J.B. [O.W.]

920. UNITED STATES, MONSANTO CHEMICAL COMPANY. (Monsanto Chem.Co.,Agric.Chem. Divn,St.Louis 66,Missouri,U.S.A.) Avadex. Pre-planting herbicide for wild oats. Tech. Inf. Sheet,Monsanto Chem.Co., 1961, pp.5.

In trials with diallate, the use of a spike-tooth harrow for incorporation has given good control of Avena fatua, provided the soil is in good tilth. Treatments made to wet, cloddy, or ridged soils have given inferior results. Diallate appears to be lost more rapidly from coarse than from fine-textured soils, and injury to sensitive crops is more likely to occur on the latter. A high soil organic matter content appears to reduce its effectiveness. The residual effect of diallate has been sufficient for it to control wild oats during a germination period of 6-8 weeks, and the application of rates of > 2 lb has provided some control of A. fatua during the following season. There did not appear to be any danger of the build-up of diallate in the soil as a result of continuous use. Autumn treatments have given erratic results, but in some cases have been as effective as spring treatments, and it is considered that the potentialities of autumn treatments are worth further investigation. Crops tolerant to diallate at rates recommended for control of A. fatua have included lentils, mustard, potatoes, carrots and small-seeded grasses, such as Bromus inermis, Poa pratensis and Phleum pratense. Studies on the fate of diallate in crops have indicated that it was not present in harvested grain of wheat and barley, flax seed, sugar-beet, rape seed or peas. Diallate is classed as moderately toxic. The acute oral LD_{50} to rats is 395 mg/kg and to dogs, 510 mg/kg. The LLD by skin absorption in rabbits is 2000-2500 mg/kg and in tests on rabbits, diallate is classed as a moderate irritant to skin and eyes. - P.J.B. [O.W.]

921. SWEZEY, A.W. and NEX, R.W. (The Dow Chem.Co.,Agric.Res.Lab.,Seal Beach,California, U.S.A.). Some chemical and physical properties of weed killers. Supplement 1. Weeds, 1961, 9,(2),209-15.

See also Weeds, 1954, 3,241-53. The empirical formula, specific gravity, melting point, vapour pressure and solubility are given for 82 additional herbicidal chemicals.
P.J.B. [O.W.]

922. TILLES, H. (Richmond Res.Labs, Stauffer Chem.Co.,Richmond,California,U.S.A.). Thiolcarbamates. Preparation and molar refractions. J.Amer.Chem.Soc., 1959, 81, 714-27.

The synthesis of 265 thiolcarbamates is described and their physical data tabulated.
P.J.B. [214(79.4)]

923. van den BOS, B.G., KOOPMANS, M.J. and HUISMAN, H.O. (Cent.Res.Lab.N.V. Philips-Duphar, Weesp, Netherlands). Investigations on pesticidal phosphorus compounds. I. Fungicides, insecticides and acaricides derived from 3-amino-1,2,4-triazole. Rec.des Trav. Chim.des Pays-Bas, 1960, 79,(7),807-22 tabs.5.

The preparation and the biological properties of a number of compounds with fungicidal, insecticidal and acaricidal activities are described. The compounds were prepared by substitution of a phosphorus containing group for a hydrogen atom of the 1,2,4-triazole nucleus in amitrole or a 5-substituted derivative thereof. Biological activity was highest when the phosphorus-containing group was a bis(dimethylamido)phosphoryl group. The phytotoxicity of these compounds to plant species and their toxicity to mice are mentioned briefly. From Author's Summary. J.W.F. [O.R.]

924. van den BOS, B.G. (Cent.Res.Lab.N.V. Philips-Duphar,Weesp.Netherlands). Investigations on pesticidal phosphorus compounds. II. On the structure of phosphorus compounds derived from 3-amino-1,2,4-triazole. Rec. des Trav.Chim.des Pays-Bas, 1960, 79,(8), 836-42.

It is shown that in the compounds formed by reaction of amitrole or a 5-substituted derivative thereof with a phosphoryl chloride, the phosphoryl group is attached to the triazole ring. Author's Summary. [O.R.]

925. GUTENMANN, W.H., SAMPE JOHN, L.E., BANNY, D.L., JONES, E.D. and LISK, D.J. (Dep.Entomology,N.Y. Stat.Coll.Agric. Cornell Univ.,Ithaca,U.S.A.). Modified Schöniger combustion for determination of residues of arsenic, bromide, chloride manganese, and nickel in pesticide-treated plant material. J.Agric.Fd Chem., 1961 9, (1),50.

A 5-l modified Schöniger combustion flask was used for the combustion of plant material prior to the determination of residues. Determination by this means of arsenic in potato tissue following the use of sodium arsenite is described. - D.M.L.S. [O.W.]

926. HIGSON, H.G. and BUTLER, D. Determination of α-(4-chloro-2-methylphenoxy) propionic acid in chloromethylphenoxypropionic acids (in herbicides) by gas-liquid chromatography with an internal standard. Analyst, 1960, 85,657-63.

The acids, extracted from acid solution with $CHCl_3$, are converted into their butyl esters. The chromatographic apparatus is described and dimethyl phthalate is used as internal standard. A modification in which an internal standard is not required is described. Abstr.J.Sci.Fd Agric., 12, 1-227.

927. HOLLANDER, J. (Univ.N.Carolina, Chapel Hill,U.S.A.). The pyrolysis of 2-(β-β-acyloxyethylanilino)-4,6-dialkoxy-s-triazines and related compounds. Ph.D. Thesis,Univ.N.Carolina, 1960, pp.67, Microfilm $2.50, Xerox $3.80. Diss.Abstr., 21,(7),1750.

928. WORDEN, A.N. (Nutritional Res.Unit, Huntingdon,England). The LD_{50} value, its use and limitations. Span, 1961, 4,(2), 52-4, figs.2.

The limitations of the LD_{50} value as an index of the toxicity hazards of pesticides are reviewed, with examples. It is concluded that the LD_{50} value is a useful and convenient index in most toxicity studies and is often a necessary preliminary to more detailed assessments of toxicity, but at best can only serve as a very approximate measure of potential risk in practice. P.J.B. [O.W.]

929. van LAMM, O. (Sta.d'Etat.,Gand, Belgium). Un danger pour l'agriculture: l'emploi irrationel de moyens de lutte en agriculture et en horticulture. [The danger to agriculture from irrational control measures in agriculture and horticulture]. Rev.de l'Agr., 1960, 13,(5), 495-505, tabs.4,bibl.30.

A review, dealing with the toxicity and danger to bees, of pesticides (including some herbicides) and of measures to prevent this, especially the use of repellants. - D.M.L.S. [G.R.I.]

930. ROBINSON, A.G. (Dep.Entomol.,Univ. Manitoba,Winnipeg,Canada). Effects of amitrole, Zytron and other herbicides on plant growth regulators on the pea aphid, Acyrthosiphon pisum (Harris) caged on broad bean, Vicia faba L. Canad.J.Plant Sci., 1961 41 (2),413-17 tabs.2,bibl.7.

Out of 30 herbicides applied to broad bean plants either to the roots or by dipping the leaves in solutions, only amitrole, Zytron (O-(2,4-dichlorophenyl)-

O-methylisopropylphosphoroamidothioate) and MI showed any activity against pea aphid. Amitrole at 100, 200 and 300 p.p.m. absorbed by the roots reduced the fecundity of adult aphids and resulted in 93.9, 100 and 100% mortality of their progeny. Applications of amitrole to the leaves or to adult aphids as a contact spray (100 p.p.m.) had no significant effect on fecundity. Zytron at 3000,2000 and 1000 p.p.m. applied to the roots resulted in 100, 100 and 98.6% mortality of adults, respectively. Applications of Zytron to leaves at 8000, 4000 and 2000 p.p.m. caused some mortality to adults and nymphs. In each case, aphids were caged on the plants at 48 hours after the herbicides were applied to the roots or to the leaves. - P.J.B. [O.W.]

931. FREED, V.H. and FURTICK, W.R. (Oregon Agric.Exp.Sta., Corvallis). The persistence of amitrole in the soil when used for chemical fallow. Hormolog, 1961, 3, (1), 3-4, tabs.4, bibl.4.

Plots at various locations on different soil types in the wheat-producing region of Oregon were treated with amitrole at 1 or 2 #, in most cases in November, December or February. The soils were sampled for amitrole residues at depths of 0-6 or 6-12 in., using a procedure capable of detecting residues as small as 0.01 p.p.m. In none out of 69 treated samples was there any evidence of residual amitrole in the soils. The analytical procedure used is described and differs from that described by K.A. Sund (J.agric.Fd Chem., 1956, 4,57-60) and B. Day and R.T. Hendrixson (Res.Progr.Rep. 16th Western Weed Conf., 1958,p.90) in that instead of using water for the initial extraction of amitrole from the soils, a solution containing 0.5% calcium chloride + 0.5% ammonium chloride was used, as this resulted in considerable increases in amitrole recovery. - P.J.B. [O.W.]

932. WELDON, L.W. and TIMMONS, F.L. (Wyoming Agric.Exp.Sta., Laramie, U.S.A.). Penetration and persistence of diuron in soil. Weeds, 1961, 9, (2), 195-203, figs.2, tabs.2, bibl.7.

In the trials reported, diuron was applied at 0.5, 1, 2 or 4 # to a field of established lucerne on sandy clay loam on 16th July, 1957, after the first cut of lucerne. Plots were then either lightly or heavily (semi-flood) irrigated. At 10 months later, plots were retreated with the original amounts of diuron. Plots were sampled on 5 dates ranging from 29th July, 1957 to 16th October, 1958 and soil from depths of 0-0.5, 0.5-2, 2-4 and 4-8 in. subjected to bioassay for diuron residues. In further trials on loamy sand irrigated by relatively deep furrows, soils were sampled 3, 7 and 15 months after applying diuron. At 3 months after application, diuron was present in significant amounts in the heavily irrigated plots only at the 0-0.5 in. level where 4 # had been applied. Under the light irrigation, diuron was present at the 0-0.5 in. level where 1, 2, and 4 # had been applied. At 11 months after application, diuron was not present at any depth in heavily irrigated plots, but on lightly irrigated plots, was still present at the same levels as at 3 months and in only slightly smaller amounts. Diuron was not carried to depths greater than 4 in. and most was localized in the 0-0.5 in. level. Irrigation did not increase the depth to which diuron was carried, but did increase the speed with which it penetrated the soil. Retreatments with diuron behaved in much the same manner as the original treatments. Under deep-furrow conditions, diuron 2 # persisted in the 0-2 in. soil depths for 15 months in amounts toxic to oats. - P.J.B. [O.W.]

933. COMES, R.D., BOHMONT, D.W. and ALLEY, H.P. (Univ.Wyoming, Laramie, U.S.A.). Movement and persistence of endothal (3,6-endoxohexahydrophthalic acid) as influenced by soil texture, temperature, and moisture levels. J.Amer.Soc.Sugar Beet Technol., 1961, 11, (4), 287-93, figs.1, tabs.1.

Trials are described and the following conclusions were drawn from them: 1. It is possible to move endothal down or up in soil by using surface- or sub-irrigation, respectively. 2. Endothal is more susceptible to leaching in sandy loam than in clay soils. 3. With an application of 2 in. of water, endothal is leached to a depth of at least 3 in. in the 3 soil types studied (sandy clay loam, sandy loam, and clay loam). Such leaching occurs as readily in an air-dry soil as in a soil wetted to field capacity. 4. Persistence is influenced by soil texture, inactivation being more rapid in sandy loams and sandy clay loams than in clay loam. 5. Dissipation is greatly influenced by soil moisture. No inactivation was measurable 8 weeks after treatment in air-dry soil. 6. The rate of inactivation was significantly less at temperatures below 20°C than at 20, 25 and 30°C. Author's conclusions modified. D.M.S. [20(70.7)]

934. ROADHOUSE, F.D.B. and BIRK, L.A. (Ontario Agric.Coll.,Guelph.) Penetration of and persistence in soil of the herbicide 2-chloro-4,6-bis(ethylamino)-s-triazine (simazine). Canad.J.Plant.Sci., 1961, 41 (2) 252-60, figs.1,tabs.5 bibl.7.

In trials in Ontario, simazine was applied at rates of 0.5, 1, 2, 6, 10 and 20 # on 24th May, 1958, to Guelph loam. Samples of soil were taken at depths of 0-1, 1-2, 2-4, 4-6 and 6-8 in. on 10th July and 28th August, 1958, on 25th May, 1959 and finally on 27th May, 1960 and residues of simazine determined colorimetrically. At 96 days after application (August, 1958), a much greater proportion of the residual simazine was present in the lower soil levels in plots receiving the lower rates of application. Most of the simazine applied at heavy rates was still confined to the top inch of soil. Where 0.5, 1 and 2 # had been applied, the average distribution at the 0-1, 1-2, 2-4 and 4-6 in. levels was 34.5, 16.1, 37.7 and 11.7%, respectively. While for the 6, 10 and 20 # rates, the average distribution was 78, 10.7, 8.6 and 2.7%. There was a slight absolute increase in simazine residues at the lower soil levels as rates of application increased. At the same sampling date, where rates of 0.5, 1, 2, 6, 10 and 20 # had been applied, the total amounts remaining at the 1-6 in. depths were 0.17, 0.25, 0.26, 0.51, 0.54 and 1.61 #. The total rainfall during this period was 8.75 in. By 25th May, 1959, simazine had disappeared entirely from the 4-8 in. depths where 0.5-2 # had been applied and the distribution of simazine between the 0-1, 1-2 and 2-4 in. depths was 57.9, 25.1 and 16.9%, respectively. Where 6, 10 and 20 # had been applied, the distribution at the 0-1, 1-2, 2-4, 4-6 and 6-8 in. depths was 70.3, 13.1, 12, 3.4 and 1.2%, respectively. The total precipitation during the first year was 34.14 in. At 2 years after application, most of the remaining simazine was still in the 0-1 in. layer. At the end of the first and second years, an average of 8.3 and 2.7% of the applied simazine remained. Control of Amaranthus retroflexus was good while the total amount of simazine remaining in the soil exceeded 1 #. Plots which received 20 # in May, 1958 contained only 0.89 # by June, 1960, and some A. retroflexus plants were appearing. Simazine at 10 # gave almost complete control of Agropyron repens. - P.J.B. [O.W.]

935. FRISSEL, M.J. The adsorption of some organic compounds, especially herbicides, on clay minerals. Versl.Landbouwk.Onderz., 1961, 67.3,pp.54, figs.18,tabs.13,bibl.59.

Adsorption isotherms of various compounds, including the herbicides 2,4-D, 2,4,5-T, MCPA, DNOC, dinoseb, simazine, 2-chloro-4,6-bis(diethylamino)-s-triazine, trietazine, monuron, and diuron, on different clay minerals were determined. Adsorption appeared to be strongly dependant upon salt concentration and pH. At very low pH all compounds are adsorbed rather strongly. In a slightly basic environment the anionic substances are adsorbed negatively, whereas the non-ionic compounds show a moderate adsorption. The reaction mechanism in aqueous environment is discussed and several types of adsorption distinguished. A table is included giving the predicted values of the adsorption of the 10 herbicides named on 3 clay minerals with different pH values. D.M.L.S. [211(492)]

936. ALEXANDER, M. and ALEEM, M.I.H. (Dep.Agron.,Cornell Univ.,Ithaca,New York State,U.S.A.). Effect of chemical structure on microbial decomposition of aromatic herbicides. J.Agric.Fd Chem., 1961, 9,(1),44-7, tabs.2,bibl.7.

The effect of molecular structure on the persistence and microbial decomposition of the following compounds was studied: phenoxyacetate; 2-chlorophenoxyacetate; (2-CPA); 4-CPA; 3-(4-chlorophenoxy) propionate; 4-CPB; 2,4-D; 3-(2,4-dichlorophenoxy)propionate; 2,4-DB; 3,4-DA; 3-(3,4-dichlorophenoxy)propionate; 4-(3,4-dichlorophenoxy)butyrate; MCPA; 3-(2-methyl-4-chlorophenoxy)-propioniate; MCPB; 2,4,5-T; 3-(2,4,5-trichlorophenoxy)-propionate; 2,4,5-TB; 15 α-substituted phenoxyalkyl carboxylic acids including 2,4-DP, mecoprop, 2,4,5-TP and phenol; and 12 chlorophenols including PCP. The results indicated that certain structural characteristics govern the persistence of aromatic molecules and may serve to predict the relative persistence of such compounds in the soil. Three hypotheses are suggested: (1) The aromatic nucleus of halogenated phenoxyalkyl carboxylic acids and phenols remains intact for long periods in compounds containing the halogen in a position meta to the phenolic hydroxyl. Should such compounds undergo polymerization, it is possible that this change may mark the decomposition. (2) With the exception of 2-CPA, w-substituted phenoxyalkyl carboxylic acids are readily attacked and degraded by the soil microflora, provided condition (1) does not

apply. (3) The decomposition of α-substituted phenoxyalkyl carboxylic acids to the stage of rupture of the aromatic nucleus is dependant on the meta halogen as well as the length of the aliphatic acid, clearage being rapid for acetate and caproate but not for propionate and valerate. - D.M.L.S. [O.W.]

937. SHAW, W.M. and ROBINSON, B. (Tennessee Agric.Exp.Sta., Knoxville, U.S.A.) Pesticide effects in soils on nitrification and plant growth. Soil Sci., 1960, 90, (5), 320-3.
Treatment of Cumberland silt loam with heptachlor, aldrin and 2,4-D at 10-100 # and chlordane at 30-300 # had no adverse effect on the soil nitrification of ammonium nitrogen. In trials on Hartsells sandy loam, aldrin, dieldrin, heptachlor and DDT were each applied at 20-200 # chlordane at 30-300 # and simazine at 10, 20, 40, 60 and 100 #. Rates of simazine greater than 10 # reduced the growth of maize and at 10 # there was almost no growth of tomato plants. With the possible exception of dieldrin, all the chemicals appeared to result in slight enhancement of nitrification. - P.J.B. [O.RE.]

938. GOAREN, P. (Sta.Agron., Alaotra, Madagascar). Note sur le Pessivage des herbicides par des pluies tropicales. [Note on herbicide leaching caused by tropical rain]. Agron.trop., Paris 1960, 15, (4), 450-4, (F.e.span.).
The results are given of a trial in which treatment with 8 herbicides applied to rice infested by weeds (mainly Pycreus tremulus, Courtoisia cyperoides and Cyperus difformis) was followed by 30, 60 or 90 mm of artificial rain (applied by sprinkling), 6, 8 or 10 hours later. Yields were always lowered by rain and resulting leaching of the herbicides, but this effect varied with the amount of rain, the number of hours between treatment and rainfall, and the herbicide used. From Field Crop Abstr. 14, 694. - J.W.F.

939. GEARD, I.D. and ALLEN, A.G. Soil sterilization. Tasmanian J.Agric., 1960, 31, (4), 407-21, figs.9.
Sterilization of soil by steam and chemicals is described in detail. Chemicals used include chloropicrin, formalin, SMDC, dichloropropane-dichloropropylene, ethylene dibromide, dibromo-chloro-propane and Cheshunt compound or other soil drenches. J.W.F. [O.W.]

940. WILHELM, S., STORKAN, R.C., SAGEN, J.E. and CARPENTER, T. (Dep.Plant Pathology, Univ., Berkeley 4, Calif., U.S.A.). Large-scale soil fumigation against broomrape. Phytopathology, 1959, 49, (8), 530-1, figs.1.
Complete control of Orobanche ludoviciana var. cooperi in a field heavily infested with seed and dried plant remains was achieved by injection of methyl bromide 180 # through chisels mounted on a tractor drawbar, the area being immediately after covered by polyethylene sheeting. The operation is described. D.M.L.S. [212(79.4)]

941. ALTMAN, J. and FITZGERALD, B.J. Colorado Agric.Exp.Sta., Fort Collins, U.S.A. Late fall application of fumigants for the control of sugar beet nematodes, certain soil fungi, and weeds. Plant Dis.Reptr. 1960, 44, (11), 868-71, figs.1, tabs.5, bibl.3.
In the late autumn of 1958, when soil temperatures were about 40°F the following treatments were applied to investigate the effect of D-D(1,2-dichloropropene-1,2-dichloropropane) on eelworm (Heterodera schachtii) and weeds: (a) weeds only sown, (b) weeds sown + D-D injected by deep chisel, (c) D-D injection only. The D-D was applied at 14 gal/ac at a depth of 7 in. and, at the same time as the D-D was injected, ridges 5 in. high were made over the injection site, resulting in a final depth of placement of 12 in. In the spring of 1959, the tops of the ridges were removed and sugar beet sown on the freshly exposed soil. At harvest, crops on soil treated with D-D gave yields more than twice as high as those where D-D was not applied. There was a substantial reduction in populations of broad-leaved weeds on treated plots and a rather smaller decrease in grass weeds, as based on post-thinning counts made on 1st September after weeding and thinning in June. - P.J.B. [48(78.8)]

942. * KULPA, W. and PANLOWSKI, F. [Weed infestation of fields at Slarvin with special reference to the content of seeds in soil]. Lublin.U.Marii Curie-Skłodowskiej. Ann.Sect.E., 1957, (1959), 12, (8), 243-300, (Pol.c.).

943. * KUPARADZE, M.M. and SAKHOKIA, M.F. Soil pollution with seeds of weed plants in Mukhrani plain, eastern Georgia. Tbilisskii Bot. Inst. Trudy 1956, 20, 331-345, (Russ.)

APPLICATION AND MACHINERY

944. GREAT BRITAIN, MINISTRY OF AGRICULTURE, FISHERIES AND FOOD. Code of practice for ground spraying. Publ. Min. Agric., Fish. Fd, [n.d.], pp.5.
This is a brief, practical guide to good ground spraying practice. - P.J.B. [463(42)]

945. GREAT BRITAIN, NATIONAL ASSOCIATION OF AGRICULTURAL CONTRACTORS. Use of aircraft in agriculture. Code of conduct. Pt.1. Aerial spraying operators. Pt.2. Ground organizations employing aerial operators. Publ. Nat. Assoc. Agric. Contractors, Gt. Britain, [n.d.] pp.3.
This voluntary code has been prepared in consultation with the Ministries of Agriculture and Aviation, the National Association of Corn and Agricultural Merchants and the National Farmers Union and is to be introduced for a trial period of 1 year. - P.J.B. [464(42)]

946. KRAUSCHE, K. (Floridin Co. Tallahassee Florida, U.S.A.). Granular pesticides. Agric. Chem., 1961, 16 (5), 31-3, figs.1.
The present relatively arbitrary standards in product specifications for granular pesticides is stressed, with particular emphasis on the wide range of particle sizes demanded by the market, the determination of the permissible amounts of fine material, the inherent deviations from the mathematical specifications of standard testing sieves, and the variability between lots in number of particles/lb for a given mesh range. - P.J.B. [O.W.]

947. *MORGAN, N.G. Spray application techniques for crop protection, with special reference to the spray deposits and their biological efficiency. Ph.D. Thesis, Univ. Bristol.

948. STANILAND, L.N. Experiences in the use of fluorescent traced sprays as an advisory tool. N.A.A.S. Quart. Rev., 1961, 12, (51), 132-8, bibl.4.
A brief review is given of practical experiences with the use of fluorescent tracers, mostly Saturn yellow, for assessing the efficiency of foliar sprays. P.J.B. [465(42)]

949. DOMBROWSKI, N. (Dep. Chem. Eng., Imperial College, London, S.W.7.). Some flow characteristics of single-orifice fan-spray nozzles. J. Agric. Engng Res., 1961, 6, (1), 37-44, figs.6, tabs.1, bibl.3. [O.W.]

950. * CRUZ, S.R., MIGUEL, B.G., JUMALON, F. and BLANCO, D.T. Experiments on weeding by flame. Araneta J. Agric 1959, 6, (1), 51-7.

951. BECKER, C.F., COSTEL, G.L., HOOD, G. and ALLEY, H.P. (Univ. Wyoming, Laramie, U.S.A.). Equipment for metering, distributing and mixing granular herbicides into bands. Trans. Amer. Soc. Agric. Engrs, 1960, 3, (2), 109-10, figs.13.
Data are given of the delivery rate of 30-60 RVM attapulgite granules delivered by commercial rotor-bar and an auger type metering device. Both types tended to grind the granules and a brush-type device was therefore tested. With this device, an increase of 10% in the moisture content of the granules increased the delivery rate by about 12%. When calibrating delivery devices however, it was concluded that errors would be small if the attapulgite granules were in equilibrium with atmospheres of relative humidities between 30 and 75. A description is given of a distributor designed to spread granules from a delivery device into a band 6 in. wide. Granules were mixed into the top 1-2 in. of soil more uniformly by rotary-tillage and finger weeder implements than by rotary hoe units or knife weeders. P.J.B. [21(78.7)]

952. CURRIE, J.D. and DOUTRE, J.L. (Fm Advisory Officer, Hamilton, New Zealand). Hill country spray plant. N.Z.J. Agric., 1960, 101, (5), 443-5, figs.5.
Equipment comprising a 120 gal tank designed to fit in the towing vehicle, a trailed hose reel, and snap couplings for the hose fittings and gun, is described and illustrated. It greatly facilitates the spraying of gorse and blackberry in rough country. The 400 ft hose is of polythene piping. - D.L.L.S. [O.RE.]

953. FRYER, J.D. (A.R.C.Weed Res.Org., Begbroke Hill, Oxford, England). Improving the reliability of soil acting herbicides. Span, 1961, 4, (2), 82-3, figs. 1.
A brief descriptive note on the spray incorporating drill. See Weed Abstr. 10: 174. - P.J.B. [O.W.]

954. GREAT BRITAIN, FARMER AND STOCK-BREEDER. Screen to beat the wild oat. Fmr Stk-Breed., 1961, 75, (3727), 63.
A screen 8 ft long can be fitted to a conventional grain auger with a blower unit and bagging-off platform at one end. As the grain passes up the auger, it is thrown against the screen, causing seeds of weeds and wild oats to be forced out. J.W.F. [O.W.]

955. KHERDEKAR, D.N. (Extension Directorate, Min.Food Agric., Delhi, India). Rope in these implements when growing paddy. Indian Fmg., 1961, 10, (12), 13. (illus.).
A single-drum paddy weeder costing about Rs 20 is described and illustrated. The roller is about 12-14 in. in diameter and has 8 pointed claws made of sheet metal and a float fixed in front. It is said to be more efficient than the Japanese rotary paddy wheeler which has 2 drums of about 6 in. over-all diameter and which tends to get bogged down in heavy, weed-infested soils. - D.M.L.S. [O.RE.]

PHYSIOLOGY, MORPHOLOGY AND ANATOMY

956. SUTHERLAND, M.L., McLANE, S.R., HART, R.D. and RAMAN, H.L. (Amchem Products, Inc., Agric. Chem. Res. Dep., Ambler, Pennsylvania, U.S.A.). The response of soybeans to several substituted benzoic acids. Hormolog, 1961, 3, (1), 5-7, figs.2, tabs.3, bibl.3.
Data are given of the formative effects and effects on growth of soybeans caused by treatment with the following substituted benzoic acids: 3-nitro-2,5-dichloro (dinoben), 3-amino-2,5-dichloro (amiben), 2,5-dichloro, 2,3,5-trichloro, 6-nitro-2,5-dichloro, 6-amino-2,5-dichloro and 2,3,6-trichlorobenzoic acid. Soybeans tolerated dinoben best, though strong formative effects occurred when they were exposed to concentrations of 10 p.p.m. or more. With amiben, no formative effects were produced by concentrations up to 20 p.p.m., but concentrations of 5 p.p.m. or more markedly suppressed top and root growth. P.J.B. [O.W.]

957. GOWING, D.P. and LEEPER, R.W. (Pineapple Res. Inst. Hawaii, Honolulu). Studies on the relation of chemical structure to plant growth-regulator activity in the pineapple plant. 3. Naphthalene derivatives and heterocyclic compounds. Bot. Gaz., 1961, 122, (3), 179-88, tabs.4, bibl.23.
The results are given of tests with 64 naphthalene derivatives, 92 heterocyclic compounds and 13 miscellaneous substances for their capacity to induce or inhibit flowering in pineapple and their toxicity to pineapple plants. Split pea-stem curvature tests were also carried out with many of these compounds. P.J.B. [O.W.]

958. ALLEN, S.E. and RHINES, C.D. (U.S.Rubber Co., Plantations Div. Res. Center Wayne New Jersey U.S.A.). Uptake and transport of radiocarbon-labelled 2,4-D and 2,4,5-T from tapping panel applications in Hevea. Proc. Natural Rubber Res. Conf., 1960, 241-9, tabs.6, bibl.11.
Uptake and transport of 2,4-D in Hevea brasiliensis are rapid where the treated panel is scraped, while that of 2,4,5-T is slow. Activity derived from the carboxyl group is highly mobile and tends to accumulate in the bark, while that derived from the methylene carbon is less mobile and tends to remain in the wood nearest the cambium. The outer wood is the primary pathway for upward transport, which constitutes the bulk of stimulant redistribution. Downward movement is more closely associated with the bark. From Author's Summary. - P.J.B. [O.RE.]

959. BLACKMAN, G.E. (A.R.C. Unit of Exptl Agron., Univ. Oxford, England). Stimulation of latex flow by plant growth regulators. Proc. Natural Rubber Res. Conf., 1960, 19-51, figs. 13, tabs. 13, bibl.42.
Experiments on the use of different substituted phenoxyacetic and benzoic acids and the physiological basis of the yield-stimulating process are reviewed. - P.J.B. [O.RE.]

960. PUDDY, C.A. and WARRIAR, S.M. (Chemara Res. Sta., Seremban, Malaya). Yield stimulation of Hevea brasiliensis by 2,4

dichlorophenoxyacetic acid. Proc.Natural Rubber Res.Conf., 1960, 194-210, figs.4, tabs.8, bibl.5.

961. BLACK, C.C. (Univ.Florida, U.S.A.). Some effects of 2,4-dichlorophenoxyacetic acid on the carbohydrate metabolism of etiolated corn seedlings. Ph.D.Thesis, Univ. Fla., 1960, pp.106, Microfilm $2.75 Xerox $5.40.

The results of these studies were considered to support the theory that treatment of etiolated maize seedlings with 2,4-D affects glucose catabolism through an increase in the amount of glucose catabolized via the pentose phosphate pathway. A theory is presented and discussed which proposes that 2,4-D in some manner affects the normal metabolic control mechanisms of intact cells. From Diss.Abstr. 21,(9),2455. - J.W.F.

962. MUNN, T.J. and WHITWORTH, J.W. (Washington State Coll., Pullman, U.S.A.). The effect of 2,4-dichlorophenoxyacetic acid on root morphogenesis in Convolvulus arvensis. Proc.9th Internat.Bot.Congr., 1959, 2,276.(Abstract)

The effect of 2,4-D on the roots of two strains of C. arvensis (one resistant and one susceptible) are described in detail.
D.M.L.S. [O.BO.]

963. BASLER, E. and NAKAZAWA, K. (Oklahoma Agric.Exp.Sta., Stillwater, U.S.A.). Some effects of 2,4-dichlorophenoxyacetic acid on nucleic acids of cotton cotyledon tissue. Bot.Gaz., 1961, 122,(3),220-32, figs.1, tabs.4, bibl.15.

The experiments reported were carried out to elucidate the magnitude, site and nature of the changes induced in the nucleic acid metabolism of cotton cotyledon tissue by culture for 48 hours in solutions containing different concentrations of 2,4-D. After culturing, most of the RNA in the microsome fraction and about half that in the soluble protein fraction was lost. RNA increased in the chloroplast fraction and there was little change in the mitochondria and nuclei. 2,4-D at 10^{-4} and 10^{-3} M prevented changes in the contents of RNA protein and stimulated respiration. The 10^{-4} M concentration decreased tissue growth. 2,4-D prevented changes in phosphatase activity during tissue culture. These results were considered to suggest that 2,4-D prevents senescense of cells and that this may be closely associated with nucleic acid and protein metabolism.
P.J.B. [O.W.]

964. * COWS, W.G. (Univ.Alberta, Edmonton, Canada). Growth responses of some grasses and cereals to plant regulators. Proc.9th Internat.Bot.Congr., 1959.

965. * KURODANI, K., YONOGI, K. and YAMAMOTO, M. On the effect of 2,4-dichlorophenoxyacetic acid to the mycelial growth of Hypochnus sasakii Shirai. Kyoto U.Forsch. auf den Geb.der Pflanzenkrank., 1959, 6, (4),132-5, (Jap.e.).

966. SZABO, S.S. and BUCHHOLZ, K.P. (Wisconsin Agric.Exp.Sta., Madison, U.S.A.). Penetration of living and non-living surfaces by 2,4-D as influenced by ionic additives. Weeds, 1961, 9,(2),177-84, figs.3, tabs.3, bibl.5.

The ionic additives used in these studies were: NH_4^+ as NH_4NO_3, Co^{++} as $CoNO_3.6H_2O$, Cu^{++} as $CuSO_4.5H_2O$, Fe^{++} as $FeC_4H_4O_6$, Mn^{++} as $MnNO_3$, PO_4^{---} as Na_2HPO_4 and Zn^{++} as $ZnNO_3.6H_2O$, all of which were combined individually with solutions of 2,4-D triethanolamine salt. In the first experiment, the penetration of 2,4-D + different ions through collodion membrane or the epidermis of Sedum sp. was studied at different pH levels. Penetration of the collodion membrane was greatest at pH 3; 2,4-D + the Co, Cu, Mn and Zn additives showed greatest penetration at pH 3 and 2,4-D + Fe at pH 5. 2,4-D + NH_4 and PO_4 greatly enhanced penetration, which was greatest at pH 6 in both cases. With Sedum epidermus, at pH 3 NH_4 and PO_4 increased 2,4-D penetration, while Fe markedly reduced it, compared with 2,4-D alone; the other ionic additives had no effect. Penetration at pH 5 in all cases was less than at pH 3. In a second experiment, 2,4-D + different ionic additives was applied to the cotyledonary leaves of sunflower (Helianthus annuus) and snapbeans (Phaseolus spp.). With snapbeans, at pH 3 Cu increased, while Fe decreased the penetration of 2,4-D. At pH 5, penetration was decreased by all the metal ions, but increased by NH_4 and PO_4. With sunflower, at pH 3 Co, PO_4 and Cu considerably increased the penetration of 2,4-D. At pH 5. Cu and Fe completely inhibited 2,4-D penetration, while NH_4 and PO_4 considerably increased it. In a third experiment, the results indicated that only in the case of Fe + 2,4-D was there any evidence of complex formation, though this was not considered to be responsible for the effect of Fe on 2,4-D absorption. There was no apparent correlation between the wettability properties of the different

solutions and the penetration effects noted. - P.J.B. [O.W.]

967. GALSTON, A.W. and KAUR, R. (Yale Univ., New Haven, Connecticut, U.S.A.). Studies on the intracellular localization of carboxyl-labelled 2,4-D in etiolated pea sections. Proc. 9th Internat. Bot. Congr. 1959, 2, 129, (Abstract).

Carboxyl-labelled 2,4-D was supplied to etiolated pea epicotyl sections in a sucrose-buffer medium. The sections were then permitted to grow for 20 hours, during which time they increased in length 70-80% and in fresh weight by 100%. The tissue was then homogenized in 0.5 M sucrose + .001 M ethylenediaminetetra-acetic acid, and the resulting homogenate fractionated by centrifugation to yield, successively, cell-wall materials, "mitochondria", and "microsomes". All precipitates and their supernatant fractions were counted for C^{14} content. In all instances the supernatant contained the great bulk of the activity, the usual ratio (supernatant: precipitate) being in excess of 10:1. The small activity in the precipitates could be further reduced by washing. Addition of an equal volume of 1 M TCA to an aliquot of the final supernatant in an attempt to precipitate the proteins resulted in a loss of activity in all fractions. This was shown to be due to a TCA-induced decarboxylation of the 2,4-D. Fractionation of the supernatant with ammonium sulfate on the other hand, resulted in the deposition of some precipitates with activity. Authors' Abstract. [O.BO.]

968. ANDERSEN, R.N. (Univ. Minnesota St. Paul, U.S.A.). Investigations of the basis of selective action of dalapon. Ph.D. Thesis Univ. Minnesota, 1960, pp. 73. Microfilm $2.50, Xerox $4.00.

Dalapon was absorbed and translocated in both sugar beet and yellow foxtail (Setaria lutescens) when it was applied either to the leaves or to the roots, and it accumulated in the younger tissues of both species. Post-em. application caused protein degradation in the shoots of both species.

The free pantothenic acid level in shoots of sugar beet was decreased 1 day after dalapon treatment, while there was only slight evidence of a decrease in the level in yellow foxtail.

The basis of the selectivity of dalapon between the 2 species appears to be in the ability of sugar beet to recover from the initial herbicidal injury. It is suggested that this ability may be due to metabolic inactivation of dalapon by sugar beet. From Diss. Abstr. 21, (7), 1721. - J.W.F.

969. FOY, C.L. (Univ. California, Davis, U.S.A.). Distributional and metabolic fate of 2,2-dichloropropionic acid (dalapon) in relation to phytotoxicity. Proc. 9th Internat. Bot. Congr., 1959, 2, 121, (Abstract).

Tracer and metabolic studies on cotton, maize, sorghum and Tradescantia with dalapon 2-C^{14} and Cl^{36} as well as non-radioactive compounds showed that dalapon was absorbed, translocated, redistributed and accumulated in higher plants (principally) as the original molecule or dissociable salt thereof. Furthermore, it remained essentially non-metabolized for long periods, especially in dormant or quiescent tissues. Some slow metabolic decomposition resulting in the release of Cl^{36} (from dalapon Cl^{36}) or the incorporation of C^{14} (from dalapon-2-C^{14}) into other compounds occurred. Dalapon was metabolized by some species of micro-organism(s), producing 5 new labelled substances. Soil detoxification probably involves similar conversions. Experiments indicated that neither penetration, translocatability, nor metabolic inactivation solely determines species specificity in the phytotoxic action of dalapon. From Author's Abstract. See also Weed Abstr. 9, 1513. D.M.L.S. [O.BO.]

970. ASHTON, F.M. (Univ. California, Davis, U.S.A.). The effect of 3-(p-chlorophenyl)-1,1-dimethylurea on the rate of photosynthesis. Proc. 9th Internat. Bot. Congr., 1959, 2, 10, (Abstract).

According to measurements taken 2,4 and 8 hours after application, monuron at 0.1 p.p.m. caused no reduction in the rate of photosynthesis of red kidney bean plants; with 1 p.p.m. the rate was not reduced at 2 hours, but was reduced 68.4% at 4 hours, and to 30.5% at 8 hours; with 10 p.p.m. the rate was reduced to 6.5% at 2 hours, 2.9% at 4 hours, and to 1.5% at 8 hours. - D.M.L.S. [O.BO.]

971. SUHD, K.A. (Exp. Sta., Hawaiian Sugar Planters' Assoc., U.S.A.). The effect of 3-amino-1,2,4-triazole on certain plant tissues grown in vitro. Physiol. Plant, 1961, 14, (2), 260-5, tabs. 1, bibl. 22.

In the studies reported, virus tumour tissue from Rumex acetosa and crown gall,

habituated and callus tissues, all from Parthenocissus tricuspidatus, were used. Amitrole inhibited the growth of all the tumour tissues, the inhibition being greatest in the crown gall and habituated tissues. The nature of the responses of the different plant tissues is discussed and the following 3 possible explanations of its activity were thought to be worth further study: (a) a possible interference with the biosynthesis of riboflavin, (b) a possible interference with the enzymatic systems containing phosphorylase and hexokinase and (c) chelation of certain metals required in enzymatic processes. It is considered that, in contrast to its reputation for being carcinogenic, amitrole may in fact prevent the growth of certain tissues. - P.J.B. [O.W.]

972. BINGHAM, S.A. (Louisiana State Univ., Baton Rouge, U.S.A.). Some effects of N-(3,4-dichlorophenyl)methacrylamide on the early growth and certain respiratory enzymes of cotton. Ph.D.Thesis, Louisiana State Univ. 1960, pp.104, Microfilm $2.75, Xerox $5.20.
Cotton plants were grown in a glasshouse for 5-6 days and then treated with Dicryl 3 %, the plants were then transferred to growth chambers at 30°C and ca. 500 ft candles of light.
Dicryl suppressed the rate of cotyledon enlargement, the elongation of internodes, and expansion of true leaves, suggesting that it may act as a weak auxin.
Dicryl suppressed growth without any substantial effect on total respiration cotyledon, depressed ascorbic acid oxidase activity in the cotyledonary tissue, but had no apparent effect on glycolic acid oxidase.
Dicryl treatment held the catalase and peroxidase activities constant for the 8-day testing period, while untreated plants increased in level of activity of these enzymes. Pectin methylesterase was depressed for several days by Dicryl. From Diss.Abstr. 21,(8),2083. - J.M.F.

973. FAWCETT, C.H., WAIN, R.L. and WIGHTMAN, F. (Wye Coll., Ashford, Kent, England). An examination of a suggested relationship between chelating properties and plant growth regulating activity. Proc.9th Internat.Bot. Congr., 1959, 2,113, (Abstract).
Various studies are described in which no evidence was found of the suggested relationship. - D.M.L.S. [O.BO.]

974. BLACKMAN, G.E. and SARGENT, J.A. (Dept.Agric., Univ.Oxford, England). The uptake of growth substances. 2. The absorption and accumulation of 2,3,5-triiodobenzoic acid by the root and frond of Lemna minor. J.exp.Bot., 1959, 10,480-503 figs. 15 bibl.37.

975. SABRAN, A.R. and RUNSEY, A.F. (Dep. Zool. Univ.Texas, Austin U.S.A.). Effects of 2,3,6-trichlorobenzoic acid on klinostatically developed geotropic curvatures of Avena coleoptiles. Physiol. Plant., 1961, 14,(2),231-41 figs.6, bibl.9.
The results of these studies are considered to support previous conclusions that 2,3,6-trichlorobenzoic acid inhibits the geotropic curvature of apical Avena coleoptile segments primarily by affecting the gravity perceiving mechanism. - P.J.D. [O.W.]

976. TAYLOR, G.A., MOORE, J.N. and DRINKWATER, W.O. Influence of 2,3,5-triiodobenzoic acid, indole-3-acetic acid and method of sample collection on translocation of foliar applied radiocalcium. Plant Phys., 1961, 36,(3),360-3, tabs.4 bibl.9.
Conducting tissue samples (from tomato plants) were selected from 3 internodes and from the petiole of the leaf used for foliar-applied ^{45}Ca application. In one series of plants the samples were cut from fresh, intact plants 24 hours after isotope application, whereas in the second series the plants were dehydrated 24 hours prior to sample selection. The pretreatment of plants with triiodobenzoic acid (TIBA) and IAA did not have any appreciable effect on ^{45}Ca translocation. Samples from plants treated with TIBA exhibited somewhat less radioactivity than samples from plants treated with IAA or control plants. Dehydration of intact plants resulted in a hundredfold overall increase in radioactivity, as compared with plants which were cut into 4 sections prior to drying. This was true regardless of chemical treatment. From Authors' Summary. - J.M.F. [O.W.]

977. SANTOS, I.S. (Cent.Exp.Sta. Univ. Philippines, College, Laguna). Effect of seed treatment with maleic hydrazide on germination and seedling growth of corn. Philipp.Agriculturist, 1960, 44,(2-3), 134-45, bibl.10.
Seed treatment with MH, including soaking in MH solution or storage with MH in powder form, resulted in a delay of at most one day in emergence of maize seedlings. There was an indication that seeds

stored with MH lost their viability faster than the untreated seeds. Seedlings grown from seeds soaked in MH solution grew very slowly and died eventually. Seedlings grown from seeds stored with MH for 12 or more days also died. There is still hope that seedlings from seeds stored with MH for 8 days or less may live to reach maturity. From Field Crop Abstr. 14 640. J.W.F.

978. ROBERTS, O.M. Univ. Coll., Cork, Eire.) Effects of maleic hydrazide on translocation of fluorescein. Proc. 9th Internat. Bot. Congr., 1959, 2,329. (Abstract).
MH reduced the rate of translocation of fluorescein and P^{32} from the leaves of Cucurbita, Begonia and Pelargonium. The rate of translocation fell to a minimum 4-6 days after spraying with MH. Recovery took place during the following four weeks and was more rapid in Cucurbita and Begonia. These results may be explained by the anatomy of the petioles. D.M.L.S. [O.BO.]

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980. HOFMANUS, M.A. Certain mitotic effects of kinetin, gibberellic acid, maleic hydrazide and indole acetic acid in onion roots. Proc. Ia. Acad. Sci. 1959 66 74-80.
Plant Breed Abstr. 31:93. See Weed Abstr. 9:423.

981. PILET, P.E. (Dep. Plant Phys., University of Lausanne, Switzerland). Auxin content and auxin catabolism of the stems of Euphorbia cyparissias L. infected by Uromyces pisi (Pers.). Phytopath. Z, 1960,40,(1),75-90, figs.4,tabs.8,bibl.26. [39(494)]

982. SEN, P.K. and BASU, R.N. (Dep. Agric., Calcutta Univ., India). Effect of growth substances on root formation in cuttings of Justicia gendarussa L. as influenced by varying levels of nitrogen nutrition of stock plants. Indian J. Plant Physiol., 1960, 3,(1),72-83, tabs.6,bibl.22.
MH at 100 p.p.m. showed a root-inhibition effect which was maximum (complete root inhibition) under a high nitrogen (N) level and decreased with a decreasing N level. The presence or absence of leaves on the cuttings had no apparent influence on the effect. D.M.L.S. [O.RE.]

983. WIGHTMAN, F. and NEISH, A.C. (Prairie Region. Lab., Saskatoon, Saskatchewan, Canada.) The influence of plant-growth regulators on cell-wall metabolism. Proc. 9th Internat. Bot. Congr., 1959, 2,430. (Abstract).
In studies in which cellulose and hemicellulose fractions of wheat coleoptile and pea stem segments were treated with uniformly labelled sucrose-C^{14}, the carbon atoms of sucrose-C^{14} were rapidly incorporated into the two major wall constituents examined and the rate of incorporation was greatly enhanced in the presence of 3-indolylacetic acid and 2,4-D. From Authors' Summary modified. - D.M.L.S. [O.BO.]

984. HAMILTON, R.H., BANDURSKI, R.S. and GRIGSBY, B.H. (480A Williams Hall, North Carolina State College, Raleigh, U.S.A.). Isolation of indole-3-acetic acid from corn kernels and etiolated corn seedlings. Plant Phys., 1961, 36,(3),354-9, figs.2,tabs.2, bibl.41.
Methods found useful for isolating IAA from kilogram quantities of plant tissue are described, using a buffered, ether-water partition column technique. - J.W.F. [O.W.]

985. NASH, S.M. and WILHELMS, S. (Dep. Plant Pathology Univ. Berkeley, California, U.S.A.). Stimulation of broomrape seed germination. Phytopathology, 1960, 50,(10),772-4, figs.1, tabs.1, bibl.18.
Gibberellic acid (1-20 p.p.m.) in agar stimulated germination of seeds of Orobanche ludoviciana var. cooperi and of O. ramosa. Stimulation tended to increase as the concentration used increased. After germination the radicle grew in about a day to a final length of 2-3 mm (O. ludoviciana) or 1.5 mm (O. ramosa). The gibberellic acid concentration did not affect the radicle length. It is suggested that in nature gibberellins may be secreted in small amounts into the rhizosphere of young plants and may thus play a part in the germination of Orobanche spp. Authors' Summary modified. - D.M.L.S. [213(70.4)]

986. BRITTON, E.C. and NEIL, T.R. (Dow Chem.Co.). Fluoroaromatic compounds. Brit. Pat., 1958, 833 163.
Fluoroaromatic compounds are obtained in good yield by decomposition of a corresponding aromatic diazonium fluoroborate in anhydrous inert fluid solvent (chlorinated aromatic hydrocarbon, e.g. 1,2,4-trichlorobenzene) in presence of alkali metal fluoride or alkali metal H fluoride, e.g., NaF or NaH fluoride (1-2 mol./mol. of BF_3 theoretically evolved). Especially claimed are (5-fluorodiphenyl-2-yloxy)acetic acid and (4-fluoro-2,5-xylyloxy) acetic acid, both useful as herbicides. Abstr.J.Sci.Fd Agric. 12,i-229.

987. GREAT BRITAIN, HOOKER ELECTRO-CHEMICAL COMPANY, 2,3,5,6-tetrachlorobenzoyl halides and their derivatives for herbicidal compositions. Brit.Pat., 1956, 833 210.
A benzoyl halide (chloride or fluoride) is treated with Cl_2 at 100-230° in presence of a catalyst to give a product, d_4^{20} 1.55-1.72, containing at least some 2,3,5,6-tetrachlorobenzoyl halide, useful in the production of herbicidal compositions (containing the corresponding acid, or a salt or ester thereof). Abstr.J.Sci.Fd Agric. 12,i-229.

988. BARKER, C.H. (Fisons Pest Control Ltd.). Agricultural chemical compositions. Brit.Pat., 1957, 831 344.
A composition, for use as fungicide, pesticide, herbicide, plant growth regulant or plant nutrient, comprises a mixture of two or more such agents and 0.01-2 wt-% of a vinylpyrrolidone polymer or copolymer, mol. wt. 10 000-100 000. From Abstr.J.Sci.Fd Agric. 12,i-228. - J.W.F.

MISCELLANEOUS

989. NORWAY, STATENS PLANTEVERN. Kjemiske middel mot ugras. [Chemicals against weeds]. Smskr Stat.Plantevern, 1961, 4/61 pp.29 tabs.2.
Tables give data of the resistance of crops and common weeds of arable land to sulphuric acid, $CaCN_2$, KOCN, white spirit, DNOC, dinoseb, MCPA, mecoprop, MCPB and 2,4-D salt, and of pasture species and common grassland weeds to MCPA, mecoprop, MCPB, 2,4-D salt and ester, 2,4,5-T ester and 2,4-D ester + 2,4,5-T ester based on the results of trials in Norway. Recommendations are given for the use of herbicides in different crops and notes are given on the characteristics and uses of the principal herbicides. - P.J.B. [57(481)]

990. JONES, G.E., ANDERSON, G.W., WAYNELL, C.G., SWITZER, C.M. and BIBBEY, R.O. 1961 Chemical weed control guide in field crops, horticultural crops, roadsides, waste places, etc. Publ.Ontario Dep.Agric., 1961, 75,pp.35. [251(71)]

991. *ELDER,W.C. Evaluation of herbicides for control of weeds in field crops; progress report 1956-58. Okla.Agric.Exp.Sta. Processed Ser., 1959 P-324,13 pp.

992. MATTHEWS, L.J. (Dep.Agric.,New Zealand). Recent progress with herbicides in New Zealand. Agric.Vet.Chem., 1961, 2, (2),74-6.
Among topics reviewed briefly are: MCPB and 2,4-DB for pastures, dalapon and 2,4-DB for lucerne, 2,3,6-TBA for deep-rooted species, monochloroacetic acid (MCA) for brassicas, MCA + MCPB for peas, CDAA for onions, amiben for carrots and 2,4,5-TP for aquatic weed control. P.J.B. [O.W.]

993. BANNERMAN, M. (N.V. Agrunol, Groningen,Netherlands). The use of pre-emergence weedkillers in Holland. Agric. Vet.Chem., 1961, 2,(2),84-5.
A brief review of the present status of pre-em. weed control, mainly in horticultural crops, in the Netherlands. - P.J.B. [O.W.]

994. BELLUE, M.K., BRITTON, E.A. and FULLER, T.C. Weed seed handbook. Descriptions and illustrations of the primary and secondary noxious weeds as included in California Seed Law. Spec. Publ.Calif.Dep.Agric., 1959, 275,pp.70.
Descriptions are given of 17 primary and 17 secondary noxious weeds, as listed in the Agricultural Code of California. P.J.B. (215(79.4))

995. EGLER, F.E. (Aton Forest, Norfolk, U.S.A.). Roadside ragweed control knowledge, and its communication between science, industry and society. Proc.9th

Internat.Bot.Congr., 1959, 2A,10-11.
This is a study of the communication of a representative sample of botanical knowledge (i.e. roadside ragweed control) among the social units concerned with it (i.e. individual, industrial and government scientists; government and city medical and health units; conservation, agricultural and sports groups; universities and museums; military and government highway authorities). The general conclusion from a postal survey was that the basic scientific knowledge is rarely communicated to, or used by, the social units, whereas incomplete and inaccurate knowledge is widely communicated. Various factors of social psychology involved in this situation are examined. - D.M.L.S.
[O.BO.]

996. WORLD HEALTH ORGANIZATION.
Specifications for pesticides. Insecticides, rodenticides, molluscicides, herbicides, auxiliary chemicals, spraying and dusting apparatus. World Health Organization, Geneva, 1961. pp.523.
The present edition has been considerably enlarged by additional World Health Organization specifications for insecticides, rodenticides and auxiliary chemicals and now contains a new section devoted to the following herbicides: 2,4-D acid, amine, sodium salt and esters, 2,4,5-T acid, amine salt and esters, MCPA acid and simazine. The information given is divided into (a) specification, including chemical and physical requirements, packaging and marking, and (b) methods of determining chemical and physical properties. Specifications are also given for spraying and dusting apparatus and appendices contain details of test methods common to several specifications and alternative routine test methods. - P.J.B. [W19ii(M)]

997. COWNS, W.G. (Alberta Univ., Edmonton,Canada). Basic and applied research in weed control. An appraisal. Agric.Inst.Rev., 1960, 15,(6),14-15,51.
A general discussion of the importance of the two types of research. - D.M.L.S.
[O.RE.]

List of Common Names and Chemical Abbreviations

The following list based on that adopted by the Weed Society of America, has been approved by the British Weed Control Council, except for those marked ▯.
An asterisk (*) signifies common names approved by the B.S.I.
A plus sign (+) signifies approval by the Weed Society of America.

amiben ▯+	3-amino-2,5-dichlorobenzoic acid
amitrole ▯+	3-amino-1,2,4-triazole
AMS ▯+	ammonium sulphamate
atrazine ▯+	2-chloro-4-isopropylamino-6-ethylamino-1,3,5-triazine
barban ▯	4-chloro-2-butynyl-N-(3-chlorophenyl)carbamate
CDAA +	2-chloro-NN-diallylacetamide
CDEA +	2-chloro-NN-diethylacetamide
CDEC +	2-chloroallyl-NN-diethyldithiocarbamate
chlorpropham *	isopropyl-N-(3-chlorophenyl)carbamate
4-CPA +	4-chlorophenoxyacetic acid
4-CPB	4-(4-chlorophenoxy)butyric acid
2,4-D +*	2,4-dichlorophenoxyacetic acid
3,4-DA +	3,4-dichlorophenoxyacetic acid
dalapon +*	2,2-dichloropropionic acid
2,4-DB *	4-(2,4-dichlorophenoxy)butyric acid
DCU ▯+	dichloralurea
2,4-DEB +	2,4-dichlorophenoxyethyl benzoate
2,4-DES *	2,4-dichlorophenoxyethyl hydrogen sulphate
di-allate	2,3-dichloroallyl diisopropylthiolcarbamate
dichlone +*	2,3-dichloro-1,4-naphthoquinone
dinosam *	2-s-amyl-4,6-dinitrophenol
dinoseb *	2-s-butyl-4,6-dinitrophenol
diquat +*	[1,1'-ethylene-2,2'-bipyridylium]$^{2+}$
diuron +*	N-(3,4-dichlorophenyl)-N'N'-dimethylurea
DMTT ▯+	3,5-dimethyltetrahydro-1,3,5,2H-thiadiazine-2-thione
DNOC *	2-methyl-4,6-dinitrophenol or 3,5-dinitro-o-cresol
2,4-DP	2-(2,4-dichlorophenoxy)propionic acid
endothal +	3,6-endoxohexahydrophthalic acid
EPTC ▯+	ethyl-NN-dipropylthiolcarbamate
erbon +	2-(2,4,5-trichlorophenoxy)ethyl-2'2'-dichloropropionate
fenac ▯+	2,3,6-trichlorophenylacetic acid
fenuron +*	N-phenyl-N'N'-dimethylurea
ipazine ▯+	2-chloro-4-diethylamino-6-isopropylamino-1,3,5-triazine
MCPA +*	4-chloro2-methylphenoxyacetic acid
MCPB *	4-(4-chloro-2-methylphenoxy)butyric acid
MCPES +	sodium 4-chloro-2-methylphenoxyethyl sulphate
mecoprop *	dl 2-(4-chloro-2-methylphenoxy)propionic acid
MH ▯+	maleic hydrazide
monuron +*	N-(4-chlorophenyl)-N'N'-dimethylurea
neburon +	N-(3,4-dichlorophenyl)-N'-butyl-N'-methylurea
NPA +	N-1-naphthylphthalamic acid
paraquat	[1,1'-dimethyl-4,4'-bipyridylium]$^{2+}$
PCP +	pentachlorophenol
PMA +	phenylmercuric acetate
propazine ▯+	2-chloro-4,6-bis(isopropylamino)-1,3,5-triazine
propham *	isopropyl-N-phenylcarbamate
simazine +*	2-chloro-4,6-bis(ethylamino)-1,3,5-triazine
SMDC ▯+	sodium methyl dithiocarbamate
2,4,5-T +*	2,4,5-trichlorophenoxyacetic acid
2,4,5-TB	4-(2,4,5-trichlorophenoxy)butyric acid
2,3,6-TBA +	2,3,6-trichlorobenzoic acid
TCA +	trichloroacetic acid
2,4,5-TES +	sodium 2,4,5-trichlorophenoxyethyl sulphate
2,4,5-TP	2-(2,4,5-trichlorophenoxy)propionic acid
trietazine ▯+	2-chloro 4-diethylamino-6-ethylamino-1,3,5-triazine

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